BUILDING MATERIAL ANALYSIS OF THREE FAIRMOUNT PARK HOUSES

Melissa Vernon Johanningsmeier

A THESIS

in

The Graduate Program in Historic Preservation

Presented to the faculties of the University of Pennsylvania in Partial Fulfillment of the Requirements for the Degree of

MASTER OF SCIENCE

1988

Jeanne Marie Teutonico

Jeanne-Marie Teutonico, Lecturer

Samuel Y. Harris,

David G. De Long

David G. De Long, Graduate Group Chairman

Table of Contents

Introduction

A building's structural evolution is often difficult to document through written and visual materials alone. Analysis of the building material itself can give a clearer understanding of the building's original physical composition and subsequent alterations. It is for this reason that this thesis will focus on the physical and chemical analysis of building materials. For each building selected in this study a short historical background and present physical and structural review will be given. This will be followed by the results of the paint and mortar analysis.

The Fairmount Park Commisssion has been kind enough to allow three of their buildings to be used in this study. The houses are: 1) Rockland in East Fairmount Park on Mount Pleasant Drive, 2) The Monastery in Wissahickon Park on Kitchen's Lane and 3) 206 Lincoln Drive in Rittenhouse Town on Lincoln Drive. (see Appendix #1). These three buildings were chosen for different reasons. 206 Lincoln Drive may soon undergo restoration if fundraising by The Friends of Historic Rittenhouse Town proves successful. Rockland is rented by the American Rowing Society. The society is planning to renovate the building, and at the present time is repainting the interior. Other renovations are planned for the interior and exterior of the building. Mortar and paint analysis are important for this renovation work. The Monastery was

chosen for two reasons. The first and foremost was that the researcher at the commencement of this study lived at the site, and this allowed an in-depth study of the building's materials as well as its deterioration processes. The second is that this building is presently undergoing renovation; an attempt is being made to document past paint and plaster surfaces in the building before they are removed because of their deteriorated condition.

Review of Sampling Technique and Analysis Procedure.

In each of the buildings, paint, plaster and mortar samples were obtained. Each sample was chosen for what it would reveal about its materials composition and also what it may reveal about the building's structural evolution. A change in paint layers from one wall to another in a room may indicate a past alteration to that room. Differences in mortar composition may indicate an addition, alteration or a repair to a building. So the aim of material analysis is two fold. The first is to better understand the materials used in past building traditions; the second is to compile information on the building's structural evolution.

All sample sites were recorded on floor plans (See Appendix #2). The samples were placed in small plastic bags and given code numbers. Masonry and wood samples were not taken because their removal was deemed to be too destructive to the buildings.

Procedure for Paint Analysis

Paint analysis is a time-consuming and difficult task; much care needs to be taken at all times. The process of identifying the media and pigment of a single paint layer in one paint sample can take up to one hour. A single paint chip can contain up to thirty layers of paint. With sixty-two samples to analyze it became clear that an in-depth analysis of each individual layer of

paint contained in every paint sample would be impossible. To reduce the amount of time spent on each sample only the first one to three layers of paint were studied in depth. The media, pigment and paint colors were matched. Because a Munsell chart was not available the colors were matched to a Philadelphia paint company's colors. Many of the white samples were not matched; most had a linseed media and had yellowed. The various samples of white were not exposed to U.V. light in order to bring back their truest shade.

Paint samples were extracted with an "Exacto" Knife from each building by cutting into the substrate. In most cases the paint was too brittle to obtain a one inch square sample without the paint flaking off the substrate. Since the one-inch square sample was found to be impossible, smaller samples were taken with more success. Where it was possible, paint samples were taken from the walls and woodwork. Not all rooms in each building were done. Once the paint samples were coded and brought to the laboratory the paint samples were set into small ice trays using small balls of clay to keep them upright, while a polyester casting resin was poured to encase half of the sample. Once the polyester resin had hardened, the samples were removed, tagged and examined. Two microscopes were used. The first was a stereoscopic microscope with a magnification from 10X to 30X. It is with this microscope that most of the work was done. The

second microscope was a stage microscope with a magnification from 10X to 100X, and was used to examine pigments and crystal formation. A polarizing microscope was not available.

The procedure for paint analysis begins with the recording of the paint layers in the paint chip. The color names given in this step are arbitrary and do not reflect a color match. It is suggested in some paint analysis procedures that the paint chip be sanded flat before recording the number and color of paint layers. In the experience of the experimenter this procedure did not always yield the most information. If the sample contains an oil-based media it will take on a shine that refracts light and blurs the divisions between the layers. Sanding also removes the natural fracture between layers found in an unsanded sample. It was necessary to experiment. In some cases the layers were easier to determine before sanding; occasionally they more difficult to discern.

Once all layers have been recorded, one half of the sample was tested for the presence of lead, using a .1 molar solution of sodium sulfide. If the paint layer contains lead, the solution will turn black. It is important to treat only one half of the sample; if several consecutive layers react the lines between layers are obscured and distinguishing the layers becomes difficult. The unrelated sections are needed as a reference. After this the sample is then subjected to UV light. Any white layer of paint that did not react with the sodium sulfide

and fluoresces yellow-green may contain zinc oxide. This pigment was not used in the United states until after 1840. The presence of zinc oxide in a paint layer, therefore, indicates that it was applied to the structure after 1840.[1]

These two tests were performed on all samples and always completed first because these tests would not destroy the paint sample. The other tests for media could destroy a sample, so they were done last. The next step was to remove the first three layers from the paint chip. This was done under the stereoscopic microscope with a razor blade. The paint layer was lightly scraped to expose a fresh surface and the color was matched. It should be noted that for accurate color matching a larger sample should examined under natural light. Next the paint layer surface was again scraped and the fragments placed on a glass slide and treated with reagents to determine the pigment and media of each layer. Finally the media of all the layers were determined. Four solvents were applied in this order: Water to test for water based paints, dichloromethane to test for latex-based paints, dimethlyformaldehyde for oil-based paints and hydochloric acid for lime or calcimine paints. This order was used because each test is progressively more destructive to the sample. Water will only dissolve water-based paints and has no effect on the other paints. Dichloromethane dissolves latex paints and slightly

softens oil-based paint, but has no effect on calcimine paints. Dimethlyformaldehyde dissolves both oil and latex paints but has no effect on calcimine paints. Hydrochloric acid is applied last because it will react with many of the pigments used in all paints. If all of the previous tests fail, then the acid will react with the paint to confirm a calcimine-based paint. If the acid is applied first it can give a false positive and destroy the sample. Unfortunately the paint sample is destroyed in the above test. It is for this reason that it is important to have two samples of every paint chip. (See Appendix #3 For Chemical test)

Procedure for Mortar Analysis

Mortar and plaster samples were taken at the edge of damaged areas where the materials were still sound. 50-gram samples were obtained from each building, coded and stored in a plastic bag and brought to the laboratory. Twenty-five grams of mortar was ground to a fine powder using a mortar and pestle. This powder was placed in a 1000 ml beaker with 300-400 ml. of 3M. HCl. The hydrochloric acid reacts with lime and other calcium carbonate based binders found in mortars. When the acid reacts with the binder, carbon dioxide is produced. The solution bubbles and foams as the binder dissolves. When all the binder has reacted with the hydochloric acid the solution no longer foams. The remaining solution consists of water containing the byproducts of the reaction (CaCl)

and the insoluble portion of the binder (sand and fine impurities). The solution is then washed with large amounts of water and swirled to suspend the fines (very small silt particles). The fines and the liquid solution are decanted off. The aggregate remains in the beaker. The fines are caught in the filter paper and the liquid is contained in a 500 ml. filter flask. There are two methods of filtering liquid from a solid: either by gravity filtration where the liquid drains through the filter paper by gravity or by the use of a vacuum system that pulls the liquid through the filter paper. The second method of filtration was used in the procedure because it is less time-consuming.

Once the sand and the fines have dried they are weighed. This weight is then subtracted from with the initial 25-gram sample to obtain the weight of the binder. The weighted percentage of binder, fines and aggregate contained in the mortar sample can then be calculated.

The aggregate is then subjected to a grain size distribution test. The aggregate is placed on the top of a stack of sieves which descends in mesh size from 2.36 mm to 75 um. Through ten minutes of gentle shaking the sand or aggregate is separated by grain size. The amount of sand caught in each sieve is weighed and compared to the initial sand sample. The end result is a [2] grain size profile of the aggregate.

The Monastery: Historical Development and Conditions Survey

The Monastery was constructed by 1752 for Joseph Gorgas, and stands three and one-half stories high.[3] It was made from rubble fieldstone with a cut ashlar front. Today the exterior of this building looks much the same, except for minor additions and alterations (for 1760 floor plans see Appendix #4). Additions constructed before 1803 included a kitchen wing and small bake oven covered by a shed. By 1900 a pantry had been added to the kitchen wing. Subsequently, after 1900, the small bake oven and shed were removed.[4] Interior alterations were made during the 1830s when Joshua Garsed owned the property. These alterations are recorded in Notes on Germantown written by John Fanning Watson. He described the alterations: "the place was last owned and occupied by Joshua Garsed, a large manufacturer of flax and twine... He has shut up many of the former windows, before equal to four to every chamber, making two on every angle of the square. Those who saw it [the Monastery] sixty years ago say that it then had a balcony all around the house - at the second story."[5] In an article for the Germantown Telegraph Watson also wrote that Garsed had closed up the corner chimneys and modernized the house to make it a comfortable dwelling. Others said that the center stairs in the house were removed and new ones put up in a different location.[6] (for 1840 floor plans see Apendix #5) After Garsed's

tenure, little was done to the house in the way of alterations other than inadvertent changes due to poor maintenance. These occurred after William Gordon Kitchen's death in 1871. He had owned the property since 1853, and during this time the buildings and lands had prospered. However, in 1873, after his death, the City of Philadelphia bought much of the mill lands which had supported the building. The Kitchens moved from the property in 1876; as a result of the buildings abandonment, its pent eaves fell off and the roof collapsed. The City of Philadelphia finally purchased the property in 1889 (See Appendix #6).[7] After minor repairs were made the building was rented to the Kitchens Lane Golf Club, which undertook a thorough renovation of the building in 1900. In this renovation, the windows which Garsed removed were replaced. Two entry doors were added on the ground floor on the west side of the building. The small bake oven and shed was removed from the kitchen wing and a porch was added to the main wing.[8]

The building today is much like it was after the 1900 renovation, although the wrap-around porch was removed sometime after 1935 and a front and back porch were put in its place. Interior alterations since 1900 include the alteration of the kitchen fireplace during the 1960s by the insertion of a smaller fireplace in the original hearth. The eighteenth-century wooden mantle was cut into and part of the mantle shelf removed. The mantle

remains in this condition today. The building's interior finishes were vandalized when it was vacant between 1960 and 1980. Shutters in the parlor were removed. All of the balusters on the stairs were broken and many of the walls damaged and defaced. Many of the interior plaster surfaces were lost because of water damage. Only one plaster ceiling survives on the first floor, and one on the second. Several of the ceilings on the third and fourth floor also remain. Sometime before 1969, the kitchen wing suffered a small fire which destroyed the dormer window and the roof. By 1969 the house was slated for demolition, but was saved when it was suggested that a children's museum be placed in the building. This idea never came to fruition, and it was not until 1980 that renovation began.

The roof was replaced on both the main and kitchen wings. The third and fourth floors were altered to accommodate an apartment. In comparing the 1935 HABS drawings with what exist today, the changes become clear (see Appendix #7). The third floor southeast bedroom was converted into a kitchen by removing a closet along the south wall and moving the entrance to the wall between the two south bedrooms. This created a new circulation pattern between the new kitchen (formerly the southeast bed room) and the new living room (formerly the southwest bedroom). A bathroom was installed in the third floor northeast bedroom. On the fourth floor a wood board partition along the west side of the stairs was moved to

the east side to create a room on the northeast side of the building. The wall between the southwest and the northwest rooms was removed to create one long room along the west side of the building. A partition separating the third floor apartment from the second floor was also installed. At this time baseboard heating was introduced into the second through fourth floors. Little in the way of alterations occurred on the second floor when a second apartment was added in 1986. A closet door was removed from the southeast bedroom and used for a closet door on the third floor living room. The bathroom was renovated and a closet added to this northeast room. The first floor main wing was unaltered, except for repainting and the substitution of sheetrock walls for damaged plaster walls. All the balusters on the stairs are new. Minor alterations have occurred in the kitchen wing. The wood floors in both the kitchen and the pantry had completely decayed and were replaced. A built-in kitchen cabinet was removed along with the remains of the plaster and lath ceiling. In 1986, the pantry was converted into a small modern kitchen by removing a pantry closet and changing the basement stairs. At the east end of the pantry a bathroom has been proposed but never fully installed. There is no heat in the first floor. A hot air system had been proposed.

Very little has changed on the exterior of the building due to the 1986 alterations. A small roof which

once sheltered the kitchen entry door was removed. The pantry window where the modern kitchen was installed was replaced and a section of the kitchen wing was repointed.

Conditions Survey

The building is presently in relatively stable condition. However, there are some plaguing deterioration mechanisms that have yet to be addressed. The first is water penetration into the foundation. This problem is caused by two factors: no gutters on the building and poor ground drainage patterns. The lack of gutters allows water to drain directly through the foundations, removing mortar from between the stone. As water pools in the basement it will elevate the humidity of the air, in turn causing the wood floor joists to begin to decay.

The second source of leakage into the building is via ground drainage. The Monastery sits on a plateau above the Wissahickon Creek, but not at the highest point of the surrounding grounds. Higher fields behind the house drain into the back yard of the building. Here, water pools along the west wall and back porch of the building. As a result, water is absorbed into the masonary wall by capillary action. In turn, both the interior plaster and the exterior stucco are spalding off the stone surface (see typographical map of site Appendix #9).

There is one structural crack in the main building, hidden by the roof of the kitchen. This crack is in the

northwest corner of the main building and runs from the second floor northwest window on the west wall of the building to a hole in the wall where plumbing has been punched through the exterior wall of the main building (see Apendix #10). The positioning of the crack seems to indicate that this corner of the wall has moved or is moving away from the rest of the building. Whether or not this crack is growing is unknown. At this point the progress on this crack cannot be monitored.

The other outstanding problem with the Monastery is the condition of the masonry joints (see Appendix #11). The gaps between the stone at the peaks are very large. 100 % repointing may not be necessary. However, the roof peaks, foundations and kitchen wing require immediate repair.

Paint Analysis for The Monastery

The objective in examining the painted surfaces in the Monastery was twofold. The first was to determine the comparative ages of the existing finishes in the building through the examination of the number of paint layers. The second was to determine the composition of the earliest paint layers in each sample. This may reveal if the paint was applied in the eighteenth century or if it was applied in a later renovation.

In observing the style of the finishes in the Monastery it appears as though the main building was altered in 1840 and 1900. The Kitchen wing seems to have the oldest existing finishes, even though structural evidence indicates that it is a later addition to the main building. By combining written information, structural evidence and results of paint and mortar analysis, the relative age of the existing finishes will be determined.

Sample Locations

On the exterior of the Monastery samples were taken from painted woodwork and stucco on the first floor level. On the interior samples were taken from the walls and wood work in three rooms on the first floor. These rooms were the kitchen, parlor and the small music room under the stairs. The entry on the first floor and rooms on the upper floors were not done because much of the paint

layers were removed during renovation work (see Appendix #2 for sample locations).

Results/Conclusions

Interior/Kitchen

All of the information gained from the paint analysis indicated that there is little eighteenth-century paint if any on the first floor of the main building. However, the interior finishes of the kitchen may be from the eighteenth century. The doorway molding from the entry to the kitchen may also be original. The fireplace mantle is of the same age, as is the doorway to the loft. The question remains, are these older elements unaltered since the kitchen wing was added? At this point all that can be determined is that these three elements are of the same age. The reason their age in relation to the age of the kitchen addition is in question is that in probing the wall on the northeast side of the kitchen wing an older plaster layer was found an inch below the present plaster layer. This indicates that this wall was altered. There is other evidence that the kitchen was altered: scars on the west wall of the kitchen suggest that a fireplace or bake oven was once here. Scars from a stair that descended into the basement predate the fireplace or oven in this same area. One explanation for these older elements being of the same age (even though the walls around them indicate alteration) is that the wooden

elements may have been moved and re-used as the kitchen changed. The conclusion is that the wooden elements are eighteenth century but they may not be in their original location.

The ceiling beams were originally exposed in the kitchen and whitewashed. Twenty-nine layers of whitewash accumulated before a plaster and lath ceiling enclosed the beams. The loft above the kitchen, as well as the section of wall above the fireplace were also whitewashed. The rest of the walls that are seen today were covered in a light green oil-base paint. In time, perhaps after the fireplace was no longer in use, the area above the fireplace was painted the same color as the walls of the room.

It is difficult to conjecture how the kitchen looked when it was first built. The first layer of wall paint is covered by a completely new layer of plaster, which includes a brown coat and white plaster. This in turn is covered by twenty-nine layers of white wash and the ceiling was then enclosed with plaster and lath. The color of the first paint is red (iron oxide); the paint found on all of the older wood work is also red. It was common to use iron oxide as a primer coat on wood work. Thus, the first paint combination may have been red walls with white woodwork that was then varnished. The ceiling beams were exposed and whitewashed as was the area above the fireplace. After the original plaster layer was covered, the ceiling remained exposed and white washed; the walls

were a light green and the woodwork was white.

Later in the paint sequence both the wall and woodwork colors become stronger. The woodwork was painted consecutively pink, green, yellow and then grained. The walls were painted strong greens and yellows. Finally, white regains its appeal and is used on all surfaces.

Music Room

The music room has been altered. At some point a new white coat of plaster was applied to the walls in this room. The west wall of this room is spalling badly because of rising damp; the older layer of plaster can be seen. This layer consisted of a base coat with fibers and a white coat of lime. This in turn was coated by thirteen layers of whitewash. The white plaster coat was applied over the whitewash and painted nine times. The woodwork in this room has very few layers of paint. The doorway which leads to the exterior on the west side of this room was added in 1900. It has the same number of paint layers as the doorway molding on the opposite side of the room. Stylistically the molding used in this doorway is older but seems to have been re-used in this location. The window is older than the rest of the woodwork in this room; it has three more layers of paint and the first coat is the same iron oxide with which the woodwork in the kitchen was coated. This suggests that the window may be an original element or at least contemporary with the kitchen finishes. The

fireplace, although it is in an 1840s style, seems to have been re-used, because it has the same number of paint layers as the doorways. The one difference is that the fireplace has a base coat of black. This fireplace may have been marblized, a common finish in the period 1820-1840. This room seems to have gone through two alterations; once in 1840 with the alteration of the fireplace and in 1900 when the door to the exterior was added and the door leading to the entry was also altered.

Based on the composition of the paint and on a comparison of paint layers with a known 1900 alteration the wall surfaces seen in this room today are probably post-1840, and most likely twentieth-century coatings. The wall begins white; this may be a primer coat for the next red coat of paint. Three out of the four samples show the next layer of paint as a translucent gray color. After this there seems to be a difference in how the wall just below the ceiling was painted as compared with the rest of the wall. The three samples taken from the middle of the wall show a red, yellow and then a green or blue sequence in paint layers. The sample from high up on the wall does not contain these colors but remains a cream white. The evidence indicates a polychromatic decorative treatment. This was a common wall treatment during the Victorian era. Another section two feet below the ceiling may have been wallpapered. The plaster wall on the northwest side of this room has the remnants of a glue on

the surface. All wall surfaces eventually return to white and are now painted green.

To determine the first paint colors applied to this room is difficult. At one point the walls were whitewashed, but what the woodwork was like is unknown. The woodwork treatment that exists seems to date from the 1900s, and the wall from somewhat before.

<u>Parlor</u>

The parlor shows much of the same treatment as the music room. The walls have been replastered and the previous plaster layer has been whitewashed, although not as extensively as in the other rooms. There is very little paint on the woodwork; it dates from the 1900 restoration. The woodwork dates from the 1840s; the earlier paint may have been removed when the twentieth-century paint was applied.

<u>Exterior</u>

The treatment of the first floor exterior of the Monastery has changed through the years. The front or the southeast wall under the porch was originally ashler cut stone pointed with white mortar. At some time the pointing mortar was whitewashed. In 1900, when doors were introduced into the west side of the building, a porch which wrapped around three sides of the house was put in place and the first floor exterior was stuccoed with a very soft mortar. The mortar was then painted seven times, mostly in shades of white but once blue. The back of the house (which like the two sides of the building is

rough field stone rubble with white mortar joints) was originally left bare. However, when a small shelter was placed over the back entrances to the kitchen and the main house (before 1900) the walls in this area were white washed. Twenty-two applications of white wash were applied over the pointed stone work before stucco was placed over the white washed walls in 1900.

Frequent periods of abandonment and neglect of the Monastery have left very little exterior paint. The samples taken were generally inconclusive, but they indicated that the oldest windows on the first floor are those on the kitchen wing and that the first coat of paint was iron oxide. This was probably a primer coat not a final coat (see Appendix #13 for test results and Appendix #12 Paint Stratigrapy).

Mortar Analysis for the Monastery

Objective and Sample Locations

The main building of the Monastery has a kitchen addition, and a thick masonry wall may have been introduced on the interior of the building between the parlor and the entry. Mortar samples were taken from these areas to see if there mortar compositions differed. Exterior mortar samples were taken from stucco added in the 1900 (photographs taken at this time verify its date), a modern stucco patch applied in 1985 and deep mortar samples from the walls of the building. These samples were taken in these locations in order to determine if the later mortar aplications were compatible with the original mortars. The composition of the original mortars was also needed if a new mortar was to be produced to repoint the building in areas of damage.

Results/Conclusions

There are six types of mortar found in the Monastery. These include two types of interior mortar The first #1 contains animal hair and is used to cover the interior wall of the main building, the second #2 is an interior deep mortar taken from the interior center wall of the parlor. Four types of exterior mortars included, #3 a deep soft yellow mortar found only in the exterior walls of the main building; #4 a white pointing mortar found in main building on the surface of the deep yellow mortar; #5

a white mortar found through out the kitchen wing exterior walls; and finally #6, modern mortars characterized by their gray color, slow dissolution in acid, and low percentages of fines and binder.

Interior Mortars

#1: Interior brown coats found beneath new layers of plaster in the parlor, music room and kitchen were similar. All contained animal hair fibers. The sample from the parlor had a higher concentration of fibers than did the other two samples. The percentage of fines in the interior sample were 5% with the kitchen wing having 12% fines. The colors of the fines from the kitchen and the music room are identical although the sample from the kitchen has twice the amount of fines. The percent of binder in these samples ranged between 30 and 40 percent of the total sample. The amount of aggregate was between 50 and 60%. The aggregate range is narrow with most falling between 600 um and 150 um. The sample in the kitchen and the music room may be of the same period the parlor sample may be later. The interior brown coats are 21-M-M, 16-M-M, 15-M-M, and 11-M-M.

#2: A second interior mortar sample (17-M-M) taken from deep within the stone wall that separates the parlor from the entry in the main building did not have the characteristic yellow color of a deep mortar found in the exterior walls of the building. This mortar is gray white

and much harder. it has a lower content of fines (11.67 %) than exterior deep mortars. The aggregate range is much the same as the exterior deep mortars but the percent of sand is higher (58.9%). This deep mortar is more like a pointing mortar in its hardness and amount of binder (29.43 %). However, it differs from pointing mortars in its range of aggregate. It is for this reason that the term transitional mortar has been applied to this sample. It has been suggested that this wall was added when a center fireplace was constructed. This mortar analysis tends to support this hypothesis.

Exterior Mortars

#3: The deep mortar found on the exterior walls of the main building of the Monastery is characterized by a burnt umber color and a high percentage of fines (15% - 30%). The range in aggregate size can be quite large with up to 24 % of the aggregate being larger than 2.35 mm. This mortar is very soft with a binder content ranging from 30% to 50 %. It washes away quickly once exposed to the elements (see samples 10-M-M, 13-M-M-B, 5-M-M, 3-M-M, 8-M-M. Appendix # 14)

#4: The pointing mortar was found throughout the main building. It is characterized by a smaller range in the aggregate size, (most of the sand falling between 1.18 mm and 150 um) its hardness and white color. The percentage of binder (40 % to 58 %) usually exceeds that of the aggregate (37 % to 44 %). It was used as a pointing mortar above the deep yellow mortar in the main building

(see Samples 4-M-M, 2-M-M, 6-M-M, 13-M-M-A Appendix #14).

#5: This type of mortar was found in the kitchen wing. All samples, whether from the interior or the exterior had the same basic composition. The percent of sand was between 45 and 53, with fines from 10 to 18 percent and binder from 30 to 40 percent. This difference in sand/binder proportions collaborates with historical evidence that the kitchen wing was added sometime after construction of the main building. (see samples 9-M-M, 12-M-M, 14-M-M, 1-M-M).

#6: Modern mortars found on the Monastery have a higher percentage of aggregate (73 %) with a smaller range in aggregate size (between 600 um and 150 um). The amount of fines is very low (5%). The hardness varies with the type of binder used. Sample 7-M-M was very hard and was very difficult to dissolve. This may indicate the use of a Portland or natural cement. There were two cases of this type of binder in the Monastery. One was the stucco on the west side of the main building (6-M-M-S) and the other was a stucco repair.

The analysis indicates that all but the modern mortars used lime for a binder. This is indicated by the relativ softness of the mortars and high acid soluble portion and gas evolution during dissolution. The aggregate used in all of the mortars found at the Monastery (except the modern mortars) came from the Wissahickon Creek. The

color, composition and range in particle size is the same. For finer work the larger aggregate was removed (see Appendix #14 for all data sheets).

The mortar analysis also indicates that the wall between the entry and parlor was a later addition. The kitchen wing was also a later addition. However, unlike the mortar from the parlor wall the kitchen wing mortar composition is very similar to that of the mortar from the main building. This information probably indicates that the kitchen wing was added earlier than the wall between the parlor and entry.

Recommendations

Deterioration caused by water penetration into the basement and the foundations of the building could be eliminated or mitigated by placing gutters on the building and regrading the land in the upper fields behind the building. Gutters would keep water out of the basement and regrading would redirect water runoff to storm drains that lined the access road to the site.

The introduction of hot air heat into the first floor should be done with caution. Punching a large hole though the main building wall below a stress crack may destablize this corner of the building. Also, introduction of this type of heating system into the first floor will require partial removal of the 19th-century floors. Before this type of heating system is introduced into this building it is recommended that a complete study of the wall movement be made. Alternative heating systems with less impact on the structure should be considered. This would determine if a hot air system is appropriate for this building.

The repointing of the Monastery should be a priority in its restoration. The roof peaks and kitchen wings need immediate attention. A lime-based mortar using one part hydrated lime to three parts washed and sieved Wissahickon Creek sand should be used.

The stucco on the first floor exterior should also be

completely removed so that the foundations may dry. The stone beneath the stucco, once exposed, may bare the scars of past windows and doors. This should also be repaired. It should be noted that without removing the water from the foundations the repointing of the first floor stone work will deteriorate quickly. It is also recommended that if there is a desire to repaint the first floor of the Monastery in the colors revealed in this study, a second study with emphasis on the composition of the first paint layer be completed and the color matching be done in natural light based on larger samples scraped down to the desired layer. If general color schemes only are needed, then the findings in this study could be used.

In conclusion the Monastery's present condition is stable and the rehabilitation of the interior progresses. However, the continued deterioration of the building's foundations and walls should be addressed. Ignoring this problem will only defeat the rehabilitation of the building in the long run.

206 Lincoln Drive: Historical Development and Conditions Survey

This building being studied sits on a bank above Lincoln Drive in Wissahickon Park. Once one of many buildings comprising Rittenhouse Town, it now stands in a small cluster of six structures. 206 Lincoln Drive is one of the oldest buildings on this site; it was erected on a tract of land purchased from Samuel Carpenter by William Rittenhouse and others in 1705/6. William Rittenhouse had already constructed the first paper mill in the colonies on this land in 1693. This building and the site surrounding it were of a great importance to colonial Philadelphia, and the family has played a significant role in Philadelphia history.[9] It is said that as the family enlarged, so did their buildings. 206 Lincoln Drive has been altered from a two and one-half story dwelling to a three-story stucco and stone building with several additions. Additions include a two and one-half story structure on the east side, a two-story wood frame addition on the back of the house, and a porch which united the three-story building with its two and one-half story addition.(see Appendix #15)

Before a complete discussion of 206 Lincoln Drive can be undertaken, it must be understood that this site is very difficult to document. The Rittenhouses who settled and built a modest-size village at this site did not record their real estate transactions with the Department

of Deeds and Records in Philadelphia. The few deeds that do exist often list past transactions, but without detail as to what improvements were on the site when those transactions took place. This makes it very difficult to determine when this building was constructed or altered, and by whom. The first deed that was found in the City Archives was written in 1760 and reviews the title transfers between 1690 and 1760.[10] (See Appendix #16)

By the language in this deed, 206 Lincoln Drive could have been constructed at any time between 1706 and 1760. Unless earlier deeds are found, it is not possible to date this building through deeds. The use of maps has also been found to be unsatisfactory. The surveys done by Christan Lehman between 1764 and 1772 do not supply any answers. The first map done in 1746 and reviewed in 1764 was drawn to show the division of property below the 20 acre plot upon which 206 Lincoln Drive sits. No dwellings are shown. Other maps done during this time do not include dwellings. It is not until 1772 that the surveys begin to show buildings. 206 Lincoln Drive and several other buildings appear in a 1772 survey showing the division of the William Rittenhouse property. The building is shown again in 1774, when Jacob and Abraham Rittenhouse divided the 18 acre plot bought from William Rittenhouse in 1760.[11] (for maps see Appendix #17) Even the interior of this building has been altered drastically over time, and its layout is of little help in determining its original configuration or age.

For the purposes of this study it will be assumed that the dwelling was constructed sometime before 1760. By looking at the surveys done in 1772, the building seems to be two and one-half story. The other buildings that exist today on this site are also two and one-half story. Unfortunately there is no hard evidence in the written record to confirm the assumption that this building was originally two and one-half story, instead of three. By looking at the inventory of furnishings found in Jonathan Rittenhouse's will the number of rooms can be speculated upon. There seem to have been one or two bed chambers, an entry, kitchen and dining room. This would equal a total of four rooms in the house, two rooms on the first floor and two on the second indicating a small two story house. (See appendix #18). Reviewing insurance survey maps done between 1874 and 1924, it is not clear whether the building was altered from a two and half story building to a three story as many secondary sources insist.[12] A change in the footprint is evident, though. In 1884 the footprint is essentially a square; this changes by 1892 when the building becomes oblong with a small extension on the back.[13] This change in footprint coincides with the change in ownership, from the estate of Naomi Rittenhouse to William Umsted.[14] William Umsted is credited with adding the two and one-half story masonry structure to the original section of the building.[15] He

must have also added the the small two-story wood frame section on the back of the building. In 1911 the footprint changes to show the addition of the wooden porch. The footprint of the masonry section is unchanged, but the number of floors is given as three.[16] Since the footprint of the building is the same as the 1891 map it may be concluded that Ulmsted completed the major alterations. This included raising the roof of the original portion from two and one-half story to three story, the two and one-half story Victorian addition, the wooden addition on the back of the building, and the wooden porch after the turn of the century. In 1916 a written survey of the building, done for Fairmount Park before they purchased the property in 1917, describes the structure as follows:[17]

> The Nurses home which was formerly the old mansion consisting of a three story stone building with two story stone and attic addition. The first floor has one large room with open grate, three other rooms, sun parlor, bath room with toilet.
>
> The second floor contains three rooms, each with large fire places, one small room and large bath room with porcelain tub, shower enclosed in marble, toilet and wash stand. The third floor contains three rooms and attic used for storage.
>
> The house is wired for electricity...

There have been a few changes in the house since this time. The fireplaces have been removed from the second floor, and the second floor shower is no longer enclosed in marble.

Conditions Survey

Since this house is a collection of additions the roof can be a problem where old and new join. At the head of the stairs on the second floor of the two and one half story addition there is evidence of a roof leak where the two roofs meet. Other roof leaks are seen in the old wing of the building on the third floor. Above the stairs, and in the small back room the plaster ceilings shows signs of water penetration. The worst water damage is seen on the third-floor chimney stack (See appendix #19). A large section of the interior plaster has fallen away from the chimney to expose the brick. On the floors below, the problem is repeated. Water is seeping into the chimney through poor flashing around the chimney on the roof and destroying the interior plaster in the older wing of the house. A glaring problem seen on the exterior of the building is the delamination of the white coat in the stucco. This creates large holes in the surface. The paint is also peeling on all surfaces. The general overall appearance of this building is poor. Some work was performed on the exterior of this building during the 1970s. All of the existing window frames, sills. and sash inside and out were to be restored, cleaned, repaired and painted and made operable and weather tight. Not all of this work was completed. New shutters were made where they were lost and the back door leading from the wooden frame addition was altered (see elevations Appendix #15).

The number of windows that were repaired is not known.

The house is presently being used as a residence and is in a poor state of repair. The heater is not working properly and emits black smoke through out the interior of the building. The roof is failing in several places and should be repaired or replaced.

The interior of 206 Lincoln Drive at present is in relatively good condition. Patching of plaster and a new coat of paint will solve most of the interior problems as long as the roof is repaired. There is some water penetration in the basement but it does not seem to be a major problem (See Appendix #20).

206 Lincoln Drive Paint Analysis

206 Lincoln Drive is a building that is not well-documented in written history and yet the folk history surrounding this building is very strong. There are plans to "restore" this building to its perceived original configuration of a two and one half story building. The paint analysis was used in this building to try and determine if any of the "original" finishes still existed in this building, so that if restored, the sections of original fabric could be salvaged. The second aim of the paint analysis was to document the structural evolution of the building. The older sections of the building should have more layers of paint than later additions.

Sample were taken from opposite ends of the building on the first floor. The dining room on the west end and the living room on the east end. Paint samples were also taken on each floor of the west end on the building to see if there was a significant change in paint layers between the second and third floors.

Results/Conclusions

The early date placed on the west end of this building is not substantiated by paint analysis. This does not mean that the building was not constructed in 1720; it merely suggests that the interior of 206 Lincoln Drive is not the original interior. The number of paint layers is not extensive; calcimine or lime wash is not found and zinc oxide appears early in the paint sequences, thus post dating

the subsequent paint layers to after 1840.

Exterior

Although little evidence remains of the earliest painted finishes, paint analysis does reveal how the building changed in the late nineteenth and early twentieth centuries. The number of paint layers found on the first floor west side exterior is much greater than on the east side first floor. This was expected since it was known that the east end of the building was added at the end of the nineteenth century. The existing exterior wood work of 206 Lincoln Drive has always been white oil-based paint. It was not until recently that the color was changed to green. The stucco that is seen on the building is a second coat with a very fine white aggregate, indicating that it is a twentieth-century application. This stucco also has several layers of paint applied to its surface. The porch floor was initially painted gray; its color then alternated between green and gray with gray finally becoming the predominant color (see Appendix #21).

Interior

First Floor

Paint samples were only taken from the woodwork on the first floor because any damage to the walls was deemed unacceptable. Analysis indicated that the dining room baseboard was usually painted white in earlier periods of its history. Out of the thirty-three layers found in this sample twenty-four were white. It is not until later in

the paint series that other colors begin to appear. Yellow, orange and red are found once, and blue twice at different intervals. The window lintel reflects the same patterns. It was originally painted white (seventeen layers of twenty-four); blue and yellow appear once in the sequence. Woodwork in the living room was painted in various shades of white fifteen times. Once again the number of paint layers on the west side of the building outnumbers the amount on the east side of the building. The one area where this does not hold true is the kitchen. The sample taken from the wooden panel in the kitchen has very few paint layers. The wooden panel may not be original to the kitchen, or paint layers were removed before a fresh coat of paint was applied.

Upper Floor

There is very little paint on the second and third floors of the west wing. The second floor was painted only seven times, while the third floor was coated only three or four times. The third floor was also replastered some time in the recent past. Another plaster layer can be seen where a roof leak has destroyed a section of the ceiling. It has been suggested that the third floor was an addition. The lack of paint seems to support this hypothesis. However, it is more likely that the surfaces seen on the second and third floor postdate that alteration and reflect changes during the later nineteenth century. It is possible that

when the east end addition was added these small west end rooms were remodelled and then rarely used.

The second floor west room wall colors were not white. The walls were initially painted yellow; that color reappears once again later in the sequence. Several shades of blue occur four times in the series with orange, pink and white occurring once. The white is the last applied paint color. The woodwork in the second floor hallway reverts back to white, although blue shows up three times in the sequence. The wall color in the stair hallway on the east end of the building is white half of the time and shades of blue of green the rest of the time. The trend seems to be a color treatment of the walls and white woodwork; this pattern continues on the third floor. Yellow and green and white are the recurring colors found on the walls and ceilings, while the wood work is white (see Apendix #22)

Mortar Analysis for 206 Lincoln Drive

Mortar analysis was performed to find the original composition of existing mortars and stucco finishes, but due to limited access to samples in areas not damaged, key mortar samples were not taken. Only four mortar samples were examined, two are from the third floor interior, one from the basement and the fourth is a surface layer of stucco from the first floor exterior.

Interior

The two samples taken on the third floor are almost identical in the percentage of sand, binder and fines, ie., 2-Ri-M: 67.03 % sand, 5.5 % fines and 27.43 % binder; 3-Ri-M: 65.42 % sand, 6.91 % fines and 27.67 % binder. The aggregate found in both samples seems to have come from the creek which runs by this building. The only noticeable difference in composition is that the sample from over the stairs (2-Ri-M) contains animal hair while the one on the fireplace chimney does not. Also the chimney sample has a larger aggregate range than the ceiling sample. The difference in composition of these two mortars may be due to where they are applied. The ceiling mortar may need the additional reinforcement that the animal hairs provided. The wall mortar may not need to be as strong so the animal hair is omitted.

The sample in the basement differs from the third floor mortars. The aggregate is not from the creek. There

were no large lime chunks found in the mortar, and the mortar was much harder than the mortars on the third floor. However the proportion of sand, fines and binder is much the same, ie., 4-Ri-M 64.19 % of sand, 6.78 % of fines and 29.03 % of binder. This seems to imply that the sand was shipped from another location and a hydraulic binder was used instead of a lime binder, but the ratio of binder to aggregate was maintained.

The other mortar sample (1-Ri-M) is a modern application of a white plaster coat on stucco. The aggregate has been selected for size and is very uniform. It has a high content of binder making it more similar to a plaster than a stucco. Percent of binder is 72.79, percent of fines 9.45 and percent of sand is 17.76 (see appendix #23 for data sheets).

Recommendations

The roof repairs should be made a priority in this building. The deterioration seen on the interior plaster ceilings and walls will only get worse with time. The areas where different roof structures meet seem to be weak points in this roof design. After repairs are complete these areas should be examined for leaks once a year. The spalling stucco on the exterior should be repaired using a compatible stucco that is determined through mortar analysis, and then painted. The interior after both the heater and roof has been repaired needs to be repainted. All of the exterior woodwork needs to be repainted. It should be noted that the first paint color found on the building was white not green.

The color combinations revealed in this study indicate that the late nineteenth and early twentieth- century wall treatments were white woodwork with wall surfaces of white blue or yellow. Before any conclusions are drawn regarding the age of this building or the period of the existing interior finishes, it is strongly recommended that deep wall samples be taken. Original plaster samples may be found beneath the nineteenth and twentieth-century plasters. This may lead to a better understanding of the building's structural evolution through time. Minor damage to small sections of wall is well worth the information to be gained. In addition Mr. Peter Odell holds samples from his restoration of the kitchen fireplace which could provid useful information.

Rockland: Historical Development and Conditions Survey

Rockland, a striking example of Federal architecture, was built c. 1810 by George Thomas. He owned the property until the death of his wife five years later. He then sold the house to Issac Jones, whose family owned the property until the City of Philadelphia purchased it in 1870 (see Appendix #24).[19] During Issac Jones' occupancy the house must have been quite opulent, judging from the inventory of furnishings found with his will (see Appendix #25).[20] Once the city came into possession of the property, its uses varied from residence to headquarters for several groups, the last two being the International Gastronomic Society (1979-1983) and the present tenant, the American Rowing Historical Society (since 1986).[21]

Rockland is a three-story masonry building with pebble-dash stucco walls and a ruled ashlar entry. Unlike the other buildings in this study, Rockland has changed little through the years. There have been no additions, and few alterations. One exception which has changed greatly is the basement. Once the location of the kitchen, it is now used for storage and contains only the furnace. The fireplace and bake oven have been bricked up, and a new cement floor put down. The kitchen is presently located on the first floor in the small room opposite the stairs. The upper floors have not changed, although a

bathroom has been introduced on the second floor in a small room adjacent to the stairs (see floor plans Appendix # 26).

Even though Rockland has not undergone major alterations, it has seen hard times. A description of the building found in the Engineers' Survey Notebook reviews Rockland's condition around 1868:[22]

> Bergdoll floor in cellar or basement bad, one side falling in. First floor good. Glass Broken-45 panes. Second floor good. Stairs good. Third floor good. Tin Roof on look out wants a little repairing around trap door. Banister on top broken, the other part of roof is shingle, not very good. 39 feet front, 40 feet deep. Front porch wants repairing.

Many of the problems described above can be seen recurring today. Several glass panes are missing in the windows; the front porch as well as the back need repair; the balusters on the roof were removed when roof work was completed in 1983. Chronic roof leaks have damaged plaster on the third floor. Plaster and wood deterioration has occurred through out the building due to the lack of heat, and to water penetration. But unlike other park houses, Rockland has not been neglected. The deterioration seen in the building today has occurred since 1976, when approximately $130,000 was paid for its restoration. But since then, little maintenance has been performed by the tenants. Adding to this problem was the lack of heat, which resulted in the freezing of water pipes, this in turn caused the destruction of the heating system and some of the interior finishes.[23]

Conditions Survey

The basement is showing signs of rising damp with effluorescence on the walls. During heavy rains, water comes into the basement through a door on the south side of the building. Also, a constantly dripping valve in the basement soaks the floor and walls. Panes of glass that are missing throughout the building need to be replaced. The third floor ceilings are damaged from past roof leaks and most of the painted surfaces in the building are peeling.

The exterior of Rockland is showing the signs of little or no maintenance. Although the interior shows these same signs, the exterior renovation cost will triple quickly if nothing is done. The stucco on the wall is beginning to spall off. This may be due to poor ground drainage, which allows water to be absorbed by the masonry and carried up the wall by capillary action. When the water freezes it forces the stucco off the wall. Much of the wood fenestration is decaying from lack of paint. The back porch baluster has been partially removed and a section of it lies below the porch. The bottom section of the leaders from the gutters has been dislodged, so that water sprays onto the building walls and seeps into the foundations.

There is a structural deformity in the south wall of Rockland. It is not know how severe this problem is is

not known; the situation may have stabilized. However, the south wall of Rockland at about its center bows out and drops. There is a definite deflection of the wall at the base. A crack is seen extending from the roof to the ground on this wall. The interior shows the effects of the drop; the window frame in the dining room is askew, as is the window frame above on the second floor (see appendix #27).

Paint Analysis for Rockland

Rockland is a high-style Federal building, built much later than the other two vernacular buildings examined in this study, and essentially unaltered structurally. It is a building in which the initial paint treatments could be revealed through paint analysis. The entry, dining room and stair hall were sampled because it was felt that these rooms would have been ornately decorated because they would have been used for entertaining. Also, if a restoration of this building was completed the correct wall treatments would be an important factor in its restoration.

Results/Conclusions

Of all three buildings examined in this study, Rockland has the most interesting and diverse wall treatments. Both wallpaper and graining were seen in the paint samples. The front porch columns were painted various shades of white; there was not any evidence of sand in any layer.

Interior

All of the first floor of Rockland was wallpapered at one time. Evidence of this is can be found in the corners where the walls meet the wood work. Samples taken in the middle of the walls will only record paint applied after the wallpaper was removed. This was not realized until the samples were analyzed in the laboratory. In examining the sequence of layers it becomes evident that the paint

samples without wallpaper are missing the first layers of paint.

The first floor samples that are complete show the first paint color as a translucent blue in the entry and dining room. This is probably a Prussian blue in linseed oil, but tests of different samples showed different results. This blue also ran along the stairs below the chair rail. The area above the chair rail on the stair hall was painted white. The next applied layer on the first floor was wall paper. The entry paper was a red and green, while the dining room paper was green. The wall below the chair rail on the stairs carried wallpaper the same color as in the entry to the second floor while the area above the chair rail remained white.

A comparison of the number of paint layers on the stair woodwork (23) and that of the doorway between the dining room and entry (Door-14, molding-8) suggests that the doorway between the dining room and the entry may not have been painted. The first layer of paint on the doorway is a pale, greenish-tinged white. This changed to a gray. Light greens and yellows followed, until it was grained, as were the stairs. The stairway woodwork was painted white until late in the paint sequence and then it was grained twice. The stairs then revert back to white. It should be mentioned that the floral pattern found on the stair woodwork is made from lead and is not carved from wood (see Appendix # 28 and Appendix # 29).

Conclusions

Rockland was found to be the most colorful of all three buildings examined in this study. In the Monastery and 206 Lincoln Drive, the predominant color was white. In Rockland there were many shades of blue, green and yellow. Red is rare, as in the other buildings. Of all the buildings, Rockland has been altered the least and still remains faithful to its architectural intent. If one were to choose a building to "restore" this would be very good candidate.

Mortar Analysis of Rockland

Mortar analysis was done on Rockland to determine the composition of the existing plaster and mortar surfaces. The analysis of the exterior rubble dash stucco was important because visual inspection of the exterior wall revealed that there were two separate applications of this type of stucco. The analysis would reveal if these two applications were of the same composition.

Exterior

Of the five mortar samples taken from Rockland three are from the exterior. A deep mortar sample was taken from beneath two layers of rubble dash stucco on the exterior of the building (2-Ro-M). This deep mortar is characterized by its softness; its binder-to-aggregate ratio is one-third to two-thirds by weight. The two rubble dash stucco samples on top of this deep mortar both have a one-quarter to three-quarters ratio of binder to aggregate (1-Ro-M,6-Ro-M). However, there is a large difference in the aggregate size and coloration between the two rubble dash stuccos. The original stucco aggregate (6-Ro-M) looks as though it came from the Schuykill River. It has mica shards and small chunks of schist stone. The overall color of this aggregate is iron brown. The newer stucco 1-Ro-M (probably a twentieth-century application) looks as though its aggregate comes from beach sand. It contains large white round pebbles not found in the original stucco. As a result this stucco is much more

lumpy and white in color.

Interior

The samples taken from the interior of the house came from the basement and the third floor. The basement sample is probably the original plaster surface in this location (3-Ro-M). It is a brown coat with animal hair to add strength. It has the same characteristics as the brown coat mortars found in the other two buildings but the amount of binder indicates a pointing mortar when compared to this sample group. The high binder content may be due to a layer of pure lime plaster covering the brown coat. The percentages by weight are: 26.29% aggregate, 10.67% fines and 63.03 % binder.

The third floor sample is a plaster with a fine white aggregate (4-Ro-M). It is very similar to the stucco sample on the exterior of 206 Lincoln Drive. It has a very high binder content, and a low fines content. The actual percentages are 31.73 % sand, 3.31 % of fines and 64.94 % binder (see appendix #30 for Mortar Data Sheets).

Recommendations

A routine maintenance schedule needs to be developed for Rockland. The repairs that are needed today are recurring problems that show at regular intervals. The damage to the third floor ceiling is from roof leaks. This roof seems to be predisposed to leakage in certain areas. For this reason the roof should be routinely inspected for holes. The rest of the interior painted surfaces are in poor condition due to the lack of heat during the winter months. A tenant that occupies the building year round is necessary. The other maintenance problems discussed in this paper are easily corrected with some diligence. The leaders that are missing their bottom sections are easily corrected. The water coming into the basement through the door could be stopped by regrading the land outside. Broken windows can be replaced. All of the suggested repairs are minor in nature and would not consume large amounts of time or resources.

Sections of the stucco on the exterior of the building are spalling off the building. At some point this building will once again need to be restuccoed. When this occurs it is suggested that the aggregate used in the new stucco resemble aggregate found in sample 6-Ro-M useing a lime binder in the proprotions of one quarter lime binder to three quarters aggregate by weight.

The use of the information provided by the paint

analysis should only be used as a starting point. If it is desired to reproduce the first paint found on the wood work and walls it is suggested that further study be done. Paint analysis is a complicated procedure and verification of these results are recommended. Also exact color matching using large samples under natural of simulated natural light.

Mortar Analysis: Conclusion

In this study of mortars it was found that 206 Lincoln Drive and the Monastery used similar aggregates. Both buildings are located in the Wissahickon Valley and used sands harvested from the local creeks. If other sand types were found in the mortar of these two buildings, it was concluded that these were later mortar applications. Similarity were found in all three buildings in the proportions of binder and aggregates found in different types of morters used in the construction of the buildings. Bedding mortars or deep mortars found between the masonry have a large range in aggregate size. The older the building the larger this range becomes. The older buildings also have a higher content of fines in the bedding mortars. This could be that the sand was taken directly from the creeks and not seived to removed the fines. The percent of binder is often equal to the amount of sand. Average proportions are: Sand 35-50%, Fines 9-30% and the binder 35-50%. Pointing mortars have a higher percentage of binder than sand and the amount of fines is much lower than in the bedding mortar. Pointing mortars are harder and have a smaller range in aggregate size; the larger particles are not found in a pointing mortar. Average proportions by weight are: Sand 30-45%, binder 40-60% and fines 4-10%.

Interior mortars usually contain more binder than sand except in the Monastery where the sand exceeds the

binder; in all buildings the aggregate is much finer than in either the bedding or pointing mortars. The interior mortars also tend to have animal hair or straw added to as reinforcement. Average proportions by weight are: 30-50% sand, 30-60% binder and 5-8% fines. The last category of mortars has been called "modern mortars." These differ from the above mortars in their strength and proportions of sand and binder. The amount of binder is very low and the amount of fines minimal. The aggregate size is always narrow. Average proportions by weight are: 70-80% sand, 5-10% fines, and 20-30% binder.

It should be understood that the above conclusions are drawn from only three houses. There are strong similarities, not shared with Rockland, between the materials used in the construction of the Monastery and 206 Lincoln Drive. More buildings need to be studied, with an understanding of when they were built and by whom. This study drew comparisons between two buildings constructed in the early to mid-eighteenth century and a third that was constructed in the early nineteenth century. The technique of construction may change over time and the conclusion in this study may only apply to buildings constructed before 1820. For an accurate understanding of building construction a larger number of buildings need to be studied.

Paint Analysis: Conclusions

Information about the buildings and progression of additions was clearly reflected in the number of paint layers applied to each structure. No conclusions were drawn in regard to identification of pigments in the first paint layers. Further work in needs to be done in this area. Perhaps to establish both an exterior and interior palette for buildings of different periods before evidence is destroyed by renovation.

In conclusion it was found that paint analysis is a valuable tool in determining the relative age of the additions and alterations found in a building. It also documents exterior and interior decorative treatments not often recorded in written documentation of buildings.

Conclusions/Recommendations

The restoration of a building is a long and involved process. It can often be expensive and time consuming. Before any restoration is attempted for a building of historical value a through investigation into the written documentation and structure needs to be performed. The physical analysis of the building is as important as the investigation of the written documentation. The building itself contains a wealth of information that is often ignored. Through a detailed examination of the building material a complete history of a building's interior and exterior treatments and alterations can be compiled. In any building there will be gaps, but with this information decisions on future interventions can be made.

In conclusion, a restoration of a building should not be started without a complete analysis of that building's structure and materials. These will reveal information on the physical changes that the building has experienced through its history.

The buildings in Fairmount Park are a rich and vital resource for the park and the public. It is unfortunate that so many of them are under-utilized and poorly maintained. Attempting to manage many structures in a large and diverse area such as Fairmount Park is difficult. The policy at this point is to deal with each building as an isolated entity, solving the problems generated by each building as they occur. In order to

generate funds and support to maintain all of the structures, it is suggested that a master plan be developed which examines the buildings and their environs as a whole. The historical background, present physical condition and use of all the buildings needs to be documented. Then the area in which each building stands needs to be studied to determine how this section of the park is used by the public and what is needed to accommodate the public's needs. A list can be generated as to what is needed in this area. The list may contain: bathrooms, information center, ranger stations, bike and boat rental, concession stands, stables, restaurant, house museum, nature center. Once this list is compiled it can then be used to determine a use for particular buildings, taking into account the building's historical background and structural alterations. With information in hand a policy can be developed on how to improve both the park and the structures within it. Once generated the master plan can then be used to generate funds from the public and private sector.

1. P.H Batcheler, "Paint Color Research and Restoration," Technical Leaflet 15 in History News. Vol. 23. No. 10. October 1968

Rutherford Gettens, and George L. Stout. "The Stage Microscope in the Routine Examination of Paintings" Technical Studies. Vol. IV, No. 4, April, 1936

Carole L. Perrault., "Techniques Employed at the North Atlantic Preservation Center for the Sampling and Analysis of Historic *architectural Paints and Finishes," Bulletin of the APT, Vol. X, No. 2, pp. 6-46

Jouce Plesters., "Cross-section and Chemical Analysis of Paint Samples" London: The National Gallery, 1956

Theodore Zuk Penn, "Decorative and Protective Finishes, 1750-1850, Materials, Process, and Craft" APT Vol. XVI No. 1, 1984. pp. 3-35

2. John Ashurst., Mortars, Plasters, and Renders in Conservation. London: Ecclesiastical Architects, and Surveyors, Association., 1983

Jeanne-Marie Teutonico., A Laboratory Manual for Architectural Conservation., Rome, ICCROM, 1988. Ex. 21

3. Title Registry of the Department of Records, Philadelphia City Hall, Deed Book: H-2-356

4. Fairmount Park Commission Records, Brief of Title to a Large Tract of Land Part of Which is Included in the Bounds of Fairmount Park. William Gordon Kitchen file, Box No. 8, Philadelphia City Archives, City Hall Annex, Philadelphia.

5. John Fanning Watson, Historical notes. p. 36. Am 3012, Manuscripts Dept. Historical Society of Pennsylvania.

6. John Fanning Watson. "The Monastery of the Wissahickon," The Germantown Telegraph, July 20, 1836. From Willits, Genealogical Notes from the Incomplete Files of the Germantown Telegraph. Germantown Historical Society.

7. Sketch. "The Monastery, Front and Back Views." By Joseph Pennell, Sept. 1878. No. 12. K 13, The Pennell Collection, Historical Society of Pennsylvania. Photograph, "The Monastery." Print and Picture Dept., Free Library of Philadelphia, Kastner Collection, p. 43, vol. 36. Photograph, "The Monastery," Penrose Collection. Wissahickon Vol. 2, Historical Society of Pennsylvania. Photograph, "The Monastery of the Wissahickon," Kastner Collection, Vol 36, p. 11. Print and Picture Dept., Free Lybrary of Philadelphia.

8. Rent Agreement, Fairmount Park Commission Files. Philadelphia Record, August 4, 1895. Fairmount Commission Files. Memorial Hall. John Bullock, photograph, "The Monastery on the Wissahickon Creek," June 1913. Print and Picture Dept., Free Library of Philadelphia.

9. David Cassal, Origin and History of the Rittenhouse Family (Rittenhouse Memorial, 1893) Philadelphia Pa. Vol 1. pp. 90, 129, 131; Vol. 2. p. 111. Horatio Gates Jones, "Historical Sketch of the Rittenhouse Paper-Mill." Reprinted from the Pennsylvania Magazine of History and Biography, October 1896 (Germantown Histroical Society).

10. Deed: From William Rittenhouse to Jacob and Abraham Rittenhouse, Peter Rittenhouse Envelope, Box # 12, Fairmount Park Commission Files, City Archives, City Hall Annex, Philadelphia.

11. Christian Lehman, "Survey of William Rittenghouse Land. 1746 and reviewed on January 21, 1764." Roxborough file. Manuscripts department, Historical Society of Pennsylvania. Christian Lehman. "Survey of Jacob and Abraham Rittenhouse Land," Feb. 26 1772. Roxborough file. Manuscripts department, Historical Society of Pennsylvania. "Draught of the Division of the land of William Rittenhouse," Feb. 29 1772, found in Origin and History of the Rittenhouse Family," Vol.1, p.91.

12. Rittenhouse Files, Fairmount Park Commission Files, Fairmount Park Commission, Memorial Hall. Philadelphia.

13. G.M. Hopkins, Atlas Map, Atlas of the City of Philadelphia, The 21st and 28th Ward, Plate # 13, 1864. The Free Library of Philadelphia, Map Division. Charles Bromley. Atlas Map, Atlas of the City of Philadelphia, The 21st Ward. Plate #15, 1892. The Free Library of Philadelphia. Map Division.

14. Title Registry of the Records, Philadelphia City Hall, Deed Book: TG-60-129.

15. Rittenhouse Town Files, Fairmount Park Commission Files.

16. Elvino V. Smith, Atlas on the 21st Ward, City of Philadelphia Plate # 11. 1911. The Free Library of Philadelphia, Map Division.

17. Jas. F. Deupsey, "Examination of the Providence General Hospital property," May 21, 1917. 206 Linclon Drive File. Fairmount Park Commission Files. Fairmount Park Commission, Memorial Hall Philadelphia.

18. Thalheimer and Wertz, "Scope of Work for 206 Linclon

Drive," Rittenhouse Town Files, Fairmount Park Commission Files, Memorial Hall.

19. Title Registry of the Department of Records, Philadelphia City Hall, Deed Book: 10-I-164. Deed Book: MR-4-345. Deed Book:

20. Issac Jones: Last Will and Testament of Issac F Jones, Will #52. 1865. Register of Will. City Hall Annex. Philadelphia Pennsylvania.

21. Rockland File, Fairmount Park Commission Files.. Fairmount Park Commission. Memorial Hall, Philadelphia Pa.

22. Engineer's Survey Note Book @1868.. Fairmount Park Commission Files, Fairmount Park Commission, Philadelphia Pa.

23. Rockland file, Fairmount Park Commission Files.. Fairmount Park Commission, Memorial Hall, Philadelphia Pa.

Notes

1a. Batcheler, P.H. "Paint Color Research and Restoration," Technical Leaflet 15 in History News, Vol. 23, No. 10, October 1968

Gettens, Rutherford J. And George L. Stout. "The Stage Microscope in the Routine Examination of Paintings" Technical Studies. Vol. IV, No. 4, April, 1936

Perrault, Carole L. "Techniques Employed at the North Atlantic Preservation Center for the Sampling and Analysis of Historic *architectural Paints and Finishes," Bulletin of the APT, Vol. X, No. 2, pp. 6-46

Plesters, Jouce. "Cross-section and Chemical Analysis of Paint Samples" London: The National Gallery, 1956

Zuk Penn, Theodore., "Decorative and Protective Finishes, 1750-1850, Materials, Process, and Craft" APT Vol. XVI No. 1, 1984. pp. 3-35

2a. Ashurst, John., Mortars, Plasters, and Renders in Conservation. London: Ecclesiastical Architects, and Surveyors, Association., 1983

Teutonico, Jeanne-Marie. A Laboratory Manual for Architectural Conservation., Rome, ICCROM, 1988, Ex. 21

1. Title Registry of the Department of Records, Philadelphia City Hall, Deed Book: H-2-356

2. Fairmount Park Commission Records, Brief of Title to a Large Tract of Land Part of Which is Included in the Bounds of Fairmount Park. William Gordon Kitchen file, Box No. 8, Philadelphia City Archives, City Hall Annex, Philadelphia.

3. John Fanning Watson, Historical notes. p. 36. Am 3012, Manuscripts Dept. Historical Society of Pennsylvania.

4. John Fanning Watson, "The Monastery of the Wissahickon," The Germantown Telegraph, July 20, 1836. From Willits, Genealogical Notes from the Incomplete Files of the Germantown Telegraph. Germantown Historical Society.

5. Sketch, "The Monastery, Front and Back Views." By Joseph Pennell, Sept. 1878. No. 12, K 13, The Pennell Collection, Historical Society of Pennsylvania. Photograph, "The Monastery." Print and Picture Dept., Free Library of Philadelphia, Kastner Collection, p. 43, vol. 36. Photograph, "The Monastery," Penrose Collection, Wissahickon Vol. 2, Historical Society of Pennsylvania. Photograph,

"The Monastery of the Wissahickon," Kastner Collection, Vol 36, p. 11, Print and Picture Dept., Free Library of Philadelphia.

6. Rent Agreement, Fairmount Park Commission Files. *Philadelphia Record,* August 4, 1895. Fairmount Commission Files. Memorial Hall. John Bullock, photograph, "The Monastery on the Wissahickon Creek," June 1913. Print and Picture Dept., Free Library of Philadelphia.

7. Title Registry of the Department of Records, Philadelphia City Hall, Deed Book: IC-2-164. Deed Book: MR-4-345, Deed Book:

8. Issac Jones: Last Will and Testament of Issac C Jones, Will #52, 1865. Register of Will. City Hall Annex, Philadelphia Pennsylvania.

9. Rockland File, Fairmount Park Commission Files., Fairmount Park Commission, Memorial Hall, Philadelphia Pa.

10. Engineer's Survey Note Book @1868., Fairmount Park Commission Files, Fairmount Park Commission, Philadelphia Pa.

11. Rockland file, Fairmount Park Commission Files., Fairmount Park Commission, Memorial Hall, Philadelphia Pa.

12. David Cassal, *Origin and History of the Rittenhouse Family* (Rittenhouse Memorial, 1893) Philadelphia Pa. Vol 1. pp. 90, 129, 131; Vol. 2, p. 111. Horatio Gates Jones, "Historical Sketch of the Rittenhouse Paper-Mill," Reprinted from the *Pennsylvania Magazine of History and Biography,* October 1896 (Germantown Historical Society).

13. Deed: From William Rittenhouse to Jacob and Abraham Rittenhouse, Peter Rittenhouse Envelope, Box # 12, Fairmount Park Commission Files, City Archives, City Hall Annex, Philadelphia.

14. Christian Lehman, "Survey of William Rittenghouse Land, 1746 and reviewed on January 21, 1764." Roxborough file. Manuscripts department, Historical Society of Pennsylvania. Christian Lehman, "Survey of Jacob and Abraham Rittenhouse Land," Feb. 26 1772. Roxborough file, Manuscripts department, Historical Society of Pennsylvania. "Draught of the Division of the land of William Rittenhouse," Feb. 29 1772, found in *Origin and History of the Rittenhouse Family," Vol.1, p.91.*

15. Rittenhouse Files, Fairmount Park Commission Files, Fairmount Park Commission, Memorial Hall, Philadelphia.

16. G.M. Hopkins, Atlas Map, Atlas of the City of

Philadelphia, The 21st and 28th Ward, Plate # 13, 1884. The Free Library of Philadelphia, Map Division. Charles Bromley, Atlas Map, Atlas of the City of Philadelphia, The 21st Ward, Plate #15, 1892, The Free Library of Philadelphia, Map Division.

17. Title Registry of the Records, Philadelphia City Hall, Deed Book: TG-60-129.

18. Rittenhouse Town Files, Fairmount Park Commission Files.

19. Elvino V. Smith, Atlas on the 21st Ward, City of Philadelphia Plate # 11, 1911. The Free Library of Philadelphia, Map Division.

20. Jas. F. Deupsey, "Examination of the Providence General Hospital property," May 21, 1917. 206 Linclon Drive File, Fairmount Park Commission Files. Fairmount Park Commission, Memorial Hall Philadelphia.

21. Thalheimer and Wertz, "Scope of Work for 206 Linclon Drive," Rittenhouse Town Files. Fairmount Park Commission Files, Memorial Hall.

22. The Monastery Floor Plans are from the 1935 Historic American Building Survey.

Bibliography

Books, Papers

Ashurst, John., Mortars, Plasters and Renders in Conservation. London: Ecclesiastical Architects' and Surveyors' Association., 1983

Cassal, David., Origin and History of the Rittenhouse Family., Philadelphia: Rittenhouse Memorial. 1893

Lynn, Catherine., Wallpaper in America from the Seventeenth Century to World War 1. New York: W.W. Norton & Company, Inc., 1980

McFarland. The Wissahickon Mills. Historical Society of Pennsylvania, Manuscripts Department.

Moss, Rodger., Century of Color Exterior Decoration for American Buildings, 1820-1920. New York: The American Life Foundation., 1981

Sorum, C.H., Introduction to Semimicro Qualitative Analysis., Third Edition., New Jersey: Prentice-Hall, Inc., 1960

Teutonico, Jeanne-Marie. A Laboratory Manual for Architectural Conservation., Rome: ICCROM, 1988

Watson, John F. Watson's Annals of Philadelphia and Pennsylvania In Olden Times. Enlarged with many revisions and Additions by Willis P. Hazard. Philadelphia: E.S. Stuart, 1898.

Webster, Richard., Philadelphia Preserved, Catalog of the Historical American Building Survey., Philadelphia: Temple University Press., 1981

Winkler, Gail Caskey, Rodger Moss., Victorian Interior Decoration, American Interiors 1830-1900., New York: Henry Holt and Company., 1986

Archival and Manuscripts Collection

Bullock, John. Photographs. Free Library of Philadelphia, Print and Picture Department.

Campbell Collection. The Historical Society of Pennsylvania, Manuscripts Department, Philadelphia.

Fairount Park Commission Files: The Monastery, Rockland and 206 Lincoln Drive. Fairmount Park Commission, Memorial Hall, Philadelphia, Pa.

Kastner Collection. The Free Library of Philadelphia. Print and Picture Department.

Lehman, Christian., Papers. The Historical Society of Pennsylvania, Manuscripts Department, Philadelphia.

The Penrose Collection. The Historical Society of Pennsylvania, Manuscripts Department.

The Pennell Collection. The Historical Society of Pennsylvania, Manuscripts Department.

Maps Department., The Philadelphia Free Library.

Philadelphia Historical Commission, Monastery File, Rockland File, Philadelphia Historical Society, City Hall Annex, Philadelphia.

Public Documents

City Hall Archives: Fairmount Park Commission Files: William Gordon Kitchen, Issac Jones and Providence General Hospital, City Hall Annex, Philadelphia Pa.

Title Regestry of the Department of Records, City hall Philadelphia, Pennsylvaina.

Register of Wills, City Hall Annex, Philadelphia Pennsylvania.

Articles

Batchler, P.H., "Paint Color Research and Restoration," Technical Leaflet 15, History News. Vol. 23, No. 10, Oct. 1968

Gettens, Rutherford J. and George L. Stout. "The Stage Microscope in the Routine Examination of Paintings" Technical Studies. Bol. IV, No. 4, April, 1936

Jones, Horatio Gates., "Historical Sketch of the Rittenhouse Paper-Mill, Reprint from the Pennsylvania Magazine of History and Biography, October 1896

Perrault, Carole. "Techniques employed at the North Atlantic Historic Preservation Center for the Sampling and Analysis of Historic Architectural Paints and Finishes. In: Bulletin of the Association for Preservation Technology, Vol. X, No. 2, 1987,

Plesters, J. "Cross-Section and Chemical Analysis of paint samples." In: <u>Studies in Conservation</u> Vol. 2, No. 3, April 1956.

Watson, J.F., "The Monastery on the Wissahickon, From a Page of the Olden Time. The Germantown Telegraph, July 20, 1836.

Zuk Penn, Theodore., "Decorative and Protective Finishes, 1750-1850, Materials, Process, and Craft" Association for Preservation Technology, Vol. XVI No. 1, 1984

Appendix #1
Site Locations

Upper Roxborough
West Mt Airy
Germantown
Roxborough
Manayunk
Belmont Hills
East Falls
RIVER
Cynwyd
River Park
Paradise
West Park
Bala
Merion
FAIRMOUNT PARK
Strawberry Mansion
MONTGOMERY CO
PHILADELPHIA CO
Wynnefield
Overbrook
Brewer
ZOO
Haddonville

Appendix #2
Sample Locations for Each Building.

Sample Sites for the Monastery. Explanation of Code, ie. 1-M-M: this means the first mortar sample from the Monastery. 1-M-P is the first paint sample taken from the Monastery. All sample sites are plotted on floor plans or elevations.

Written description of sample sites taken from the Monastery.

1-M-M: Exterior southeast wall of kitchen wing.
2-M-M: Exterior southeast wall of main building, west corner, ribbon pointing found beneath stucco.
3-M-M: Exterior southeast wall of kitchen wing mortar sample taken beneath 1-M-M.
4-M-M: Exterior southeast wall of main building, west corner, mortar sample from beneath ribbon pointing 2-M-M.
5-M-M: Exterior southeast wall of main building, west corner, deep mortar sample from beneath 4-M-M.
6-M-M: Exterior northwest wall, east corner on main building pointing found beneath 6-M-M-S.
6-M-M-S: Exterior northwest wall, east corner on main building surface stucco.
7-M-M: Exterior southwest wall main building, 20th century stucco.
8-M-M: Exterior southwest wall main building. Deep mortar sample from where 20th-century door was introduced into the wall.
9-M-M: Exterior northwest wall, kitchen wing, west corner mortar sample.
10-M-M: Exterior northwest wall, east corner of main building, deep mortar sample beneath 6-M-M.
11-M-M: Interior, center of northwest wall kitchen wing, mortar and plaster sample from between beams right below the ceiling.
12-M-M: Interior northeast wall kitchen wing, mortar sample from above window in loft.
13-M-M: Interior, crawl space above modern kitchen. Originally the northeast wall of main building now enclosed in the crawl space. Morter sample a. White pointing mortar.
b. yellow mortar beneath the white pointing.
14-M-M: Interior, crawl space above modern kitchen, originally the southeast wall of kitchen. Mortar sample.
15-M-M: Interior west room or music room, southwest wall mortar and plaster sample beneath 18-M-M.
16-M-M: Interior, northwest wall of parlor above door from the entry to the parlor. Top plaster layer over 20-M-M and 21-M-M.
17-M-M: Interior, northwest wall of parlor. Mortar sample taken from the stone wall exposed by the removal of door molding.
18-M-M: Interior, southwest wall of music room, top plaster sample above 15-M-M.
19-M-M: Interior northeast wall music room, mortar sample just below ceiling center of the wall.
20-M-M: Interior: northwest wall parlor above door from the entry to the parlor, plaster layer between 16-M-M and 21-M-M.
21-M-M: Interior, northwest wall parlor above the door from the entry to the parlor, brown coat beneath 20-M-M.

<u>Monastery Paint Samples</u>

1-M-P: Exterior, northwest wall, paint sample from east side shutter center window.
2-M-P: Exterior, northeast wall, kitchen wing first floor window lintel.
3-M-P: Exterior, northwest wall, kitchen wing, east window.
4-M-P: Exterior, southeast wall main building, west corner, paint sample from on top of stucco see 2-M-M.
5-M-P: Exterior, northwest wall, kitchen wing, west corner, white wash sample.
6-M-P: Exterior, northwest wall, main building, east corner, white wash layer between 6-M-M and 6-M-M-S, Stucco-white wash-mortar.
7-M-P: Exterior: southeast wall, west corner, main building. Paint on ribbon pointing, white wash-stucco-paint-ribbon pointing mortar, see 4-M-M and 5-M-M, and 4-M-P.
8-M-P: Interior: northwest wall, kitchen wing, center of wall beneath ceiling. Mortar plaster and paint sample beneath a later mortar and plaster coat.
9-M-P: Interior, northeast wall, kitchen wing, paint sample from fireplace mantle.
10-M-P: Interior, northeast wall, kitchen wing, paint sample from wall above fireplace mantle.
11-M-P: Interior. whitewash from kitchen wing beams.
12-M-P: Interior: Northwest wall, kitchen wing, white wash layer over 11-M-M.
13-M-P: Interior: Northeast wall, kitchen wing, paint sample from door to loft.
14-M-P: Interior: Northwest wall, kitchen wing, wall paint sample from center of the wall four feet above the floor.
15-M-P: Interior, southwest wall, kitchen wing, door jamb, door way from kitchen to entry.
16-M-M: Interior: Northeast wall kitchen wing, paint sample from on top of 12-M-M. Loft space, below window.
17-M-P: Interior: Northeast wall. Kitchen wing, white wash sample from stair to loft.
18-M-P: Interior, Northwest wall, main building, music room, paint sample, west corner wall.
19-M-P: Interior, northwest wall, main building, music room, window molding.
20-M-P: Interior, southwest wall, music room, second paint layer found beneath plaster layer 18-M-M. On top of 15-M-M.
21-M-P: Interior, Southwest wall, main building, music room, door way moulding to exterior.
22-M-P: Interior, Southwest wall, main building music room, paint sample from wall over fireplace mantle.
23-M-P: Interior, Northeast wall main building, music room, paint sample from center wall just below the ceiling.
24-M-P: Interior, Northeast wall, door way to entry from music room. Molding of the door way.
25:
26-M-P: Interior southeast wall parlor, doorway moulding, doorway from entry to parlor.
27-M-P: Interior, southwest wall, main building, music room, paint from fire place mantle.

Sample Sites for Rockland

Mortar

1-Ro-M: Exterior, East side, Rubble dash stucco beneath the north window.
2-Ro-M: Exterior, East side, layer of stucco beneath the rubble dash stucco 6-Ro-M. Under north window.
3-Ro-M: Interior, West wall of stair way into basement.
4-Ro-M: Interior, third floor. Plaster sample from underneath the stairs to the roof.
5-Ro-M: Interior, dining room, south side, ceiling. Plaster sample.
6-Ro-M: Exterior, east side, rubble dash stucco underneath 1-Ro-M. Under north window.

Paint

1-Ro-P: Interior, paint sample from stair baseboard final.
2-Ro-P: Interior, South side dining room, ceiling paint sample.
3-Ro-P: Interior, South side paint sample from ceiling in dining room.
4-Ro-P: Interior, West side wall south section, paint sample one foot from ceiling
5-Ro-P: Interior, second floor paint sample above chair rail.
6-Ro-P: Interior, first floor entry, paint sample of trim around doors.
7-Ro-P: Exterior, east side, paint samples from porch columns.
8-Ro-P: Interior, south side of dining room, paint sample from rosettes on ceiling.
9-Ro-P: Interior, west wall, northwest corner, paint sample from below the chair rail.
10-Ro-P: Interior, east side, entry, wall paper sample.
11-Ro-P: Interior, east Side, entry, paint sample.
12-Ro-P: Interior, stairway wall second floor above chair rail.
13-Ro-P: Interior, doorway between entry and dining room, paint sample from molding.
14-Ro-P: Interior, stairway wall, second floor below the chair rail.

206 Lincoln Drive

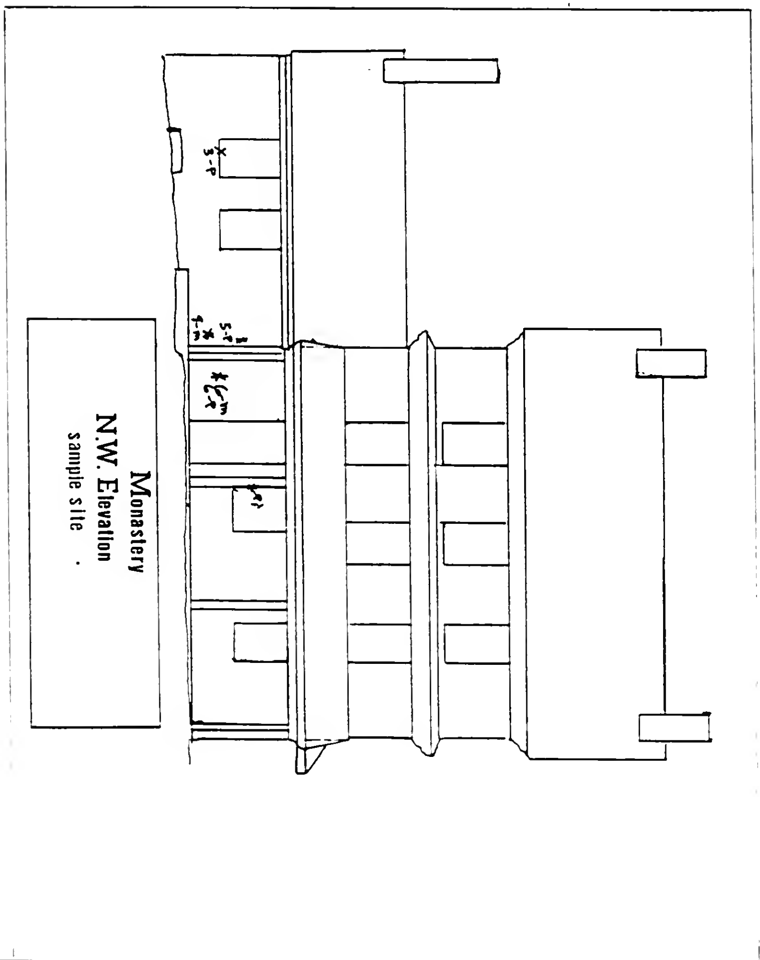
Mortar

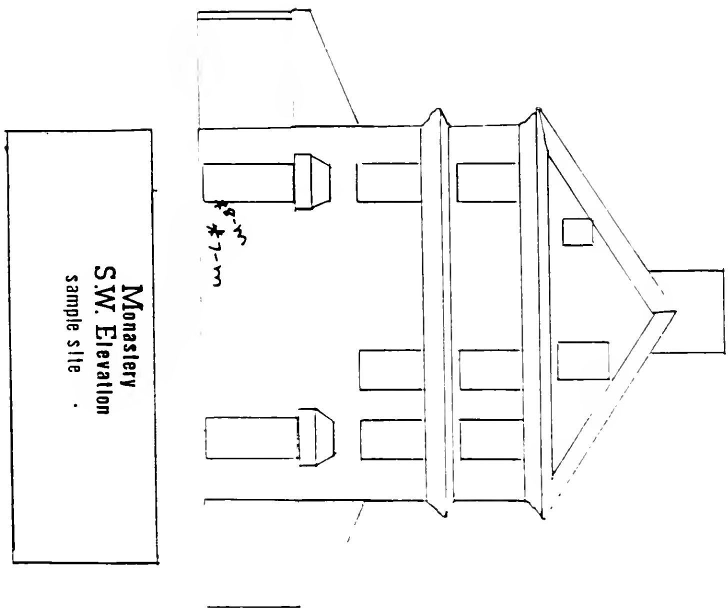
1-Ri-M: Exterior, south face, Victorian addition, white coat of stucco.
2-Ri-M: Interior, plaster sample from the third floor above the door which leads to the west side room.
3-Ri-M: Interior, mortar and plaster sample from fireplace chimney stack in the west room.
4-Ri-P: Interior, mortar sample west side of basement wall.
5-Ri-P: Interior, plaster sample from the ceiling above the stairs on the third floor.

Paint

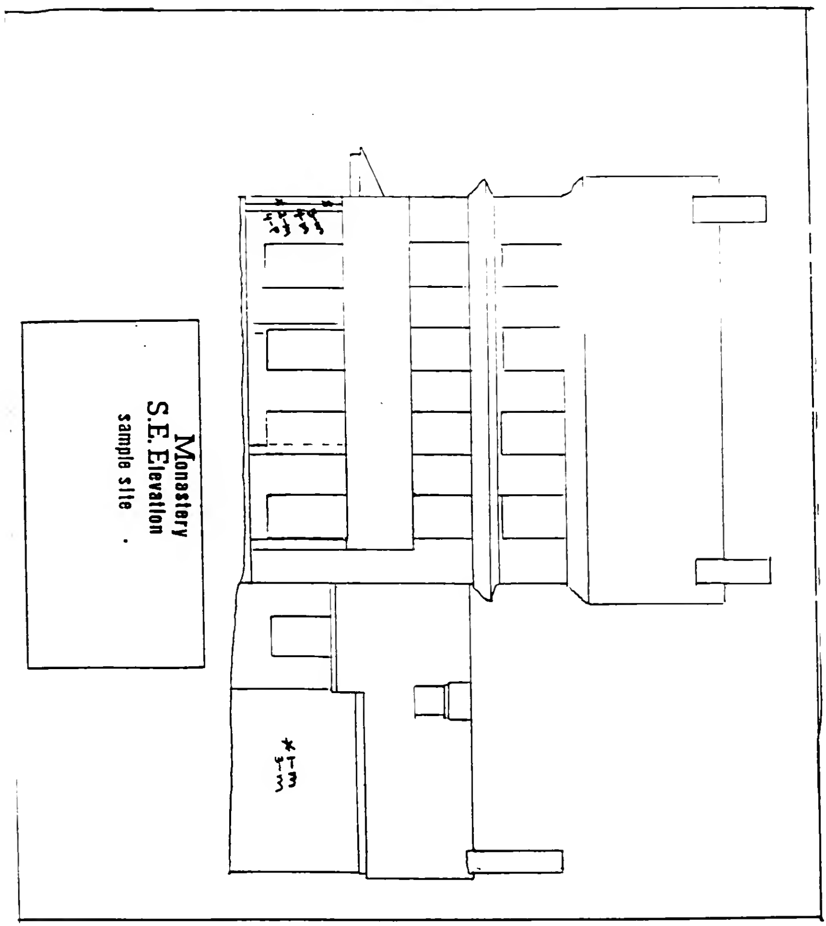
1-Ri-P: Interior, second floor south side, doorjamb, on door way leading from the stiarway to the west side room.
2-Ri-P: Interior, third floor, south side, door jamb, on the door way leading from the stairway to the west side room.

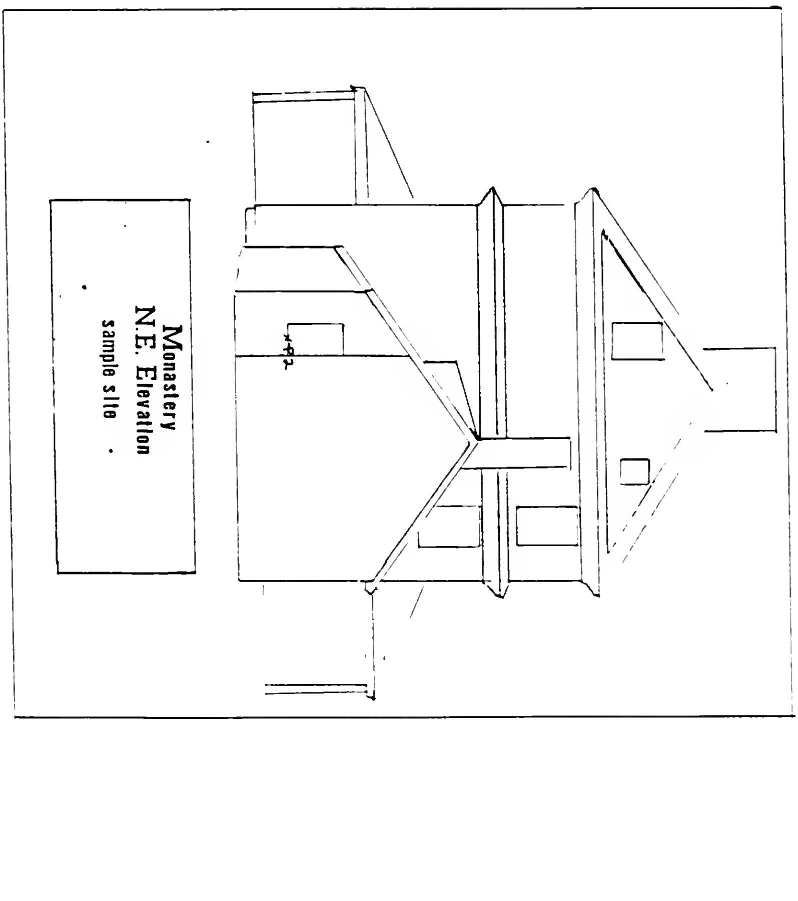
3-Ri-P: Interior: east wall in the living room southeast window lintel.
4-Ri-P: Interior: doorway from living room to stairway/entry. Sample taken from entry side of moulding.
5-Ri-P. Interior: third floor, west room ceiling paint and plaster.
6-Ri-P: Interior, west wall. West room second floor southwest corner.
7-Ri-P: Interior, First floor kitchen opposite entry door on wooden partition.
8-Ri-P: Exterior, east wall, southeast window lintel and shutter.
9-Ri-P: Exterior. South wall, Victorian wing southeast window.
10-Ri-P: Exterior. South side west section of porch.
11-Ri-P: Exterior. South wall, Victorian wing entry door moulding.
12-Ri-P: Exterior. South wall, West section, 4th window from the east.
13-Ri-P: Interior, south wall, dining room, west window lintel.
14-Ri-P: Interior, south wall, dining room, southwest corner baseboard.

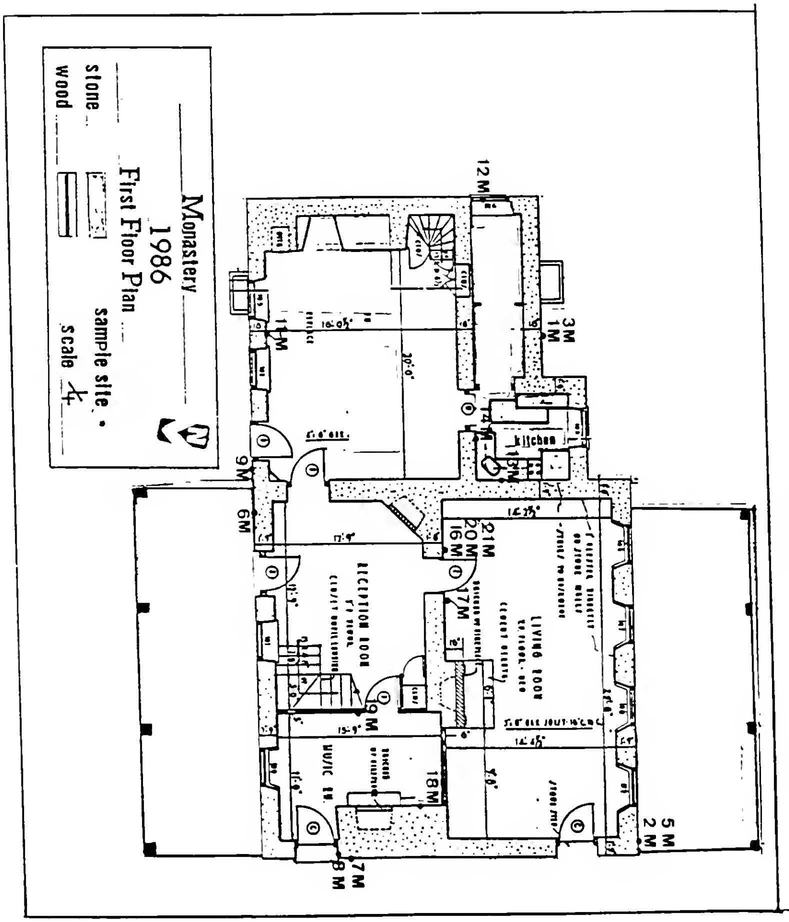

Monastery
N.W. Elevation
sample site

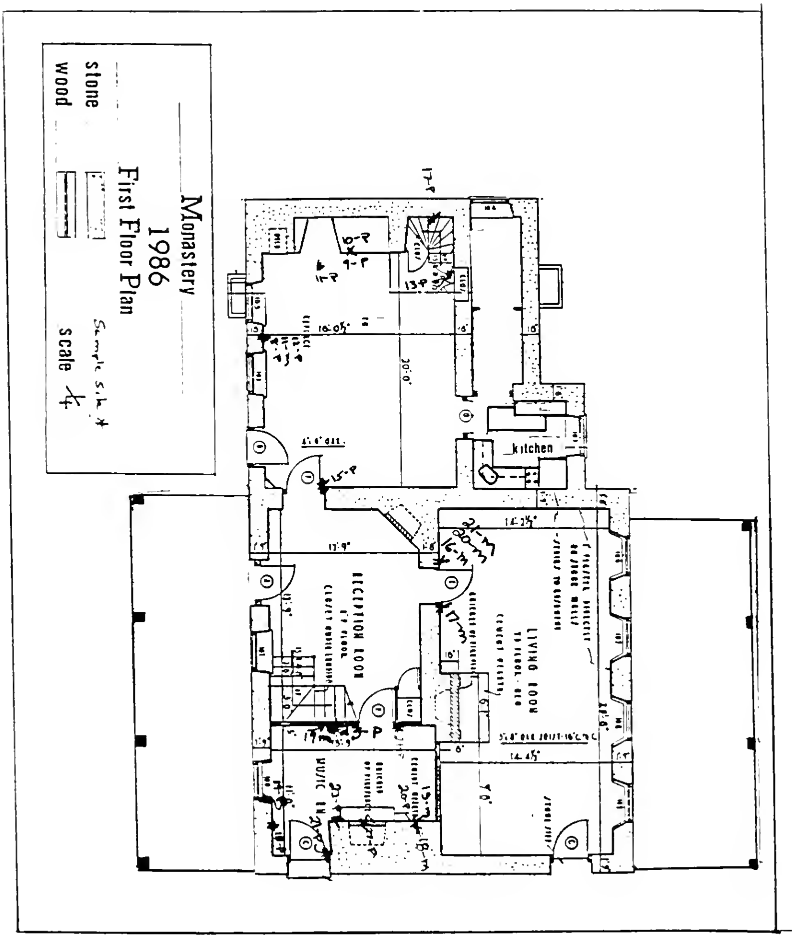


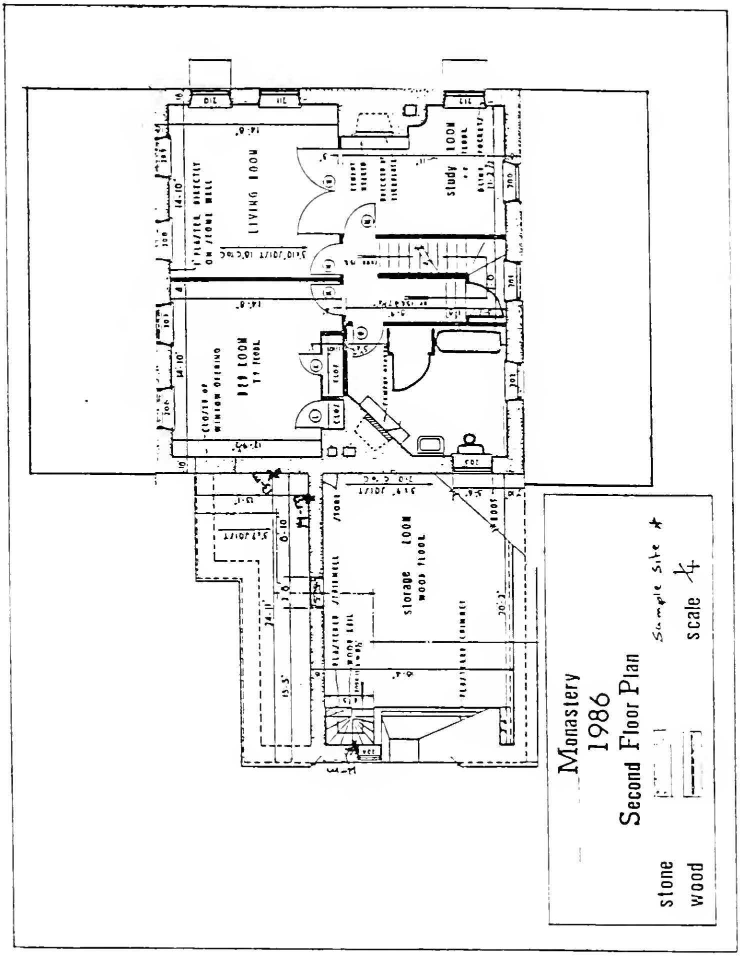
Monastery
S.W. Elevation
sample site
#7-M
#8-M

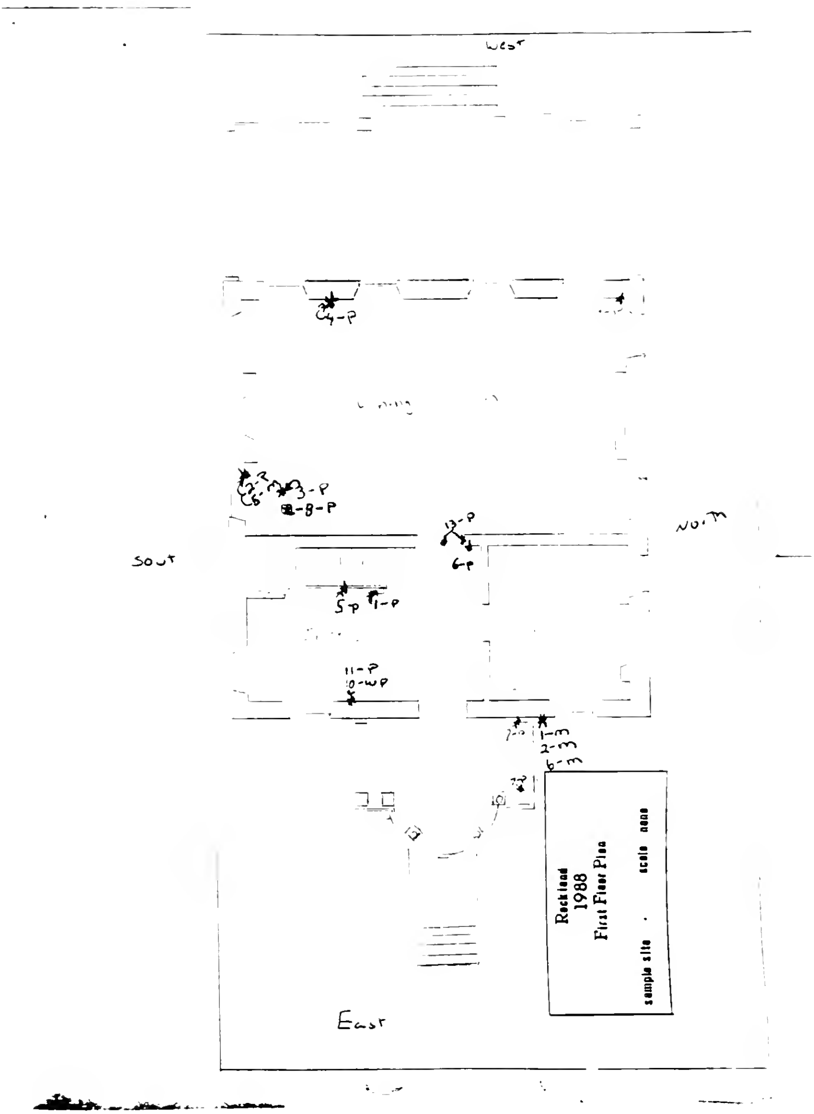

Monastery
S.E. Elevation
sample site

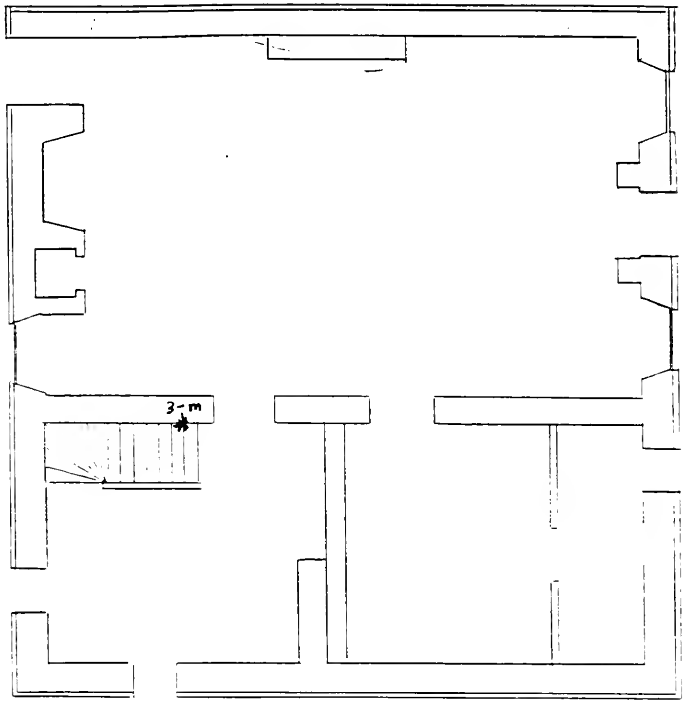

Monastery
N.E. Elevation
sample site


Monastery
1986
First Floor Plan
sample site
scale
stone
wood
kitchen
12 M
3 M
1 M
11 M
14 M
13 M
9 M
6 M
21 M
20 M
16 M
17 M
19 M
18 M
7 M
8 M
5 M
2 M


Monastery
1986
First Floor Plan
stone
wood
scale
kitchen

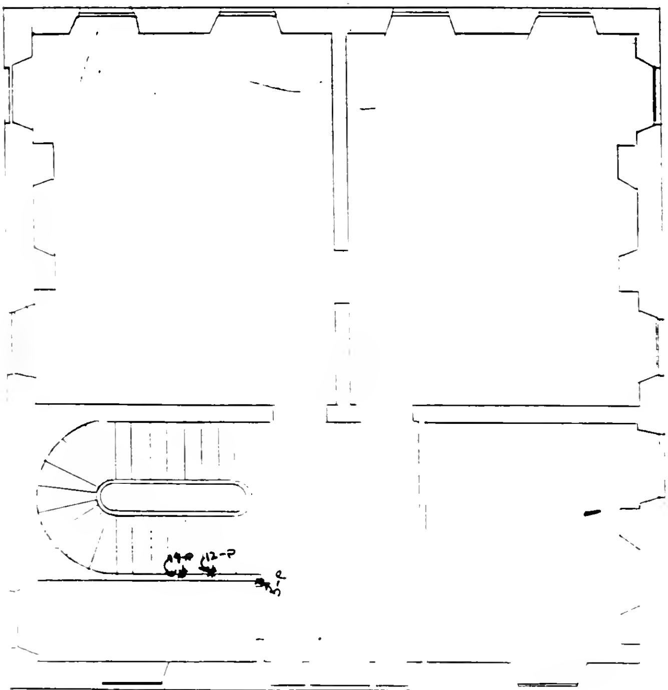

Monastery
1986
Second Floor Plan
Sample site
scale
stone
wood
living room
bed room
study room
storage room
wood floor


West
East
4-P
3-P
8-P
13-P
6-P
5-P
1-P
11-P
Rockland
1988
First Floor Plan
sample site
scale none



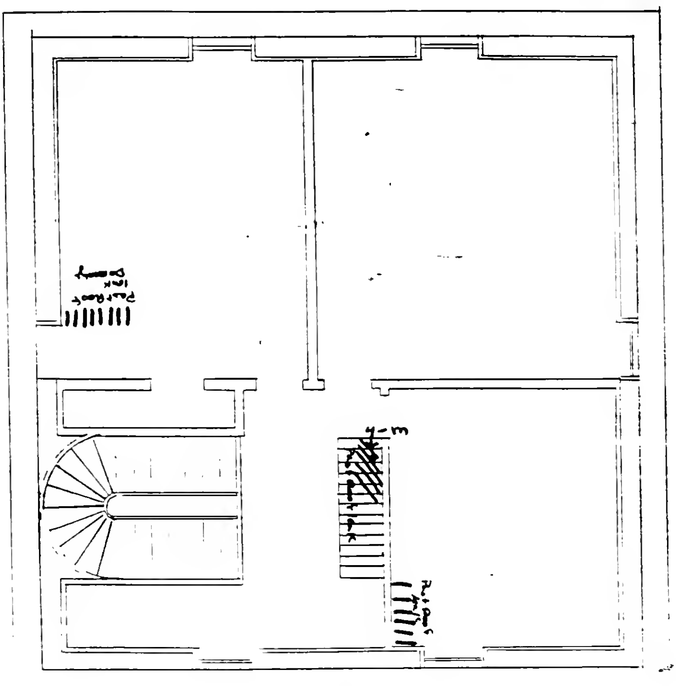
Rockland
1988
Cellar Floor Plan

sample site · scale none



Rockland
1988
Second Floor Plan

sample site · scale none



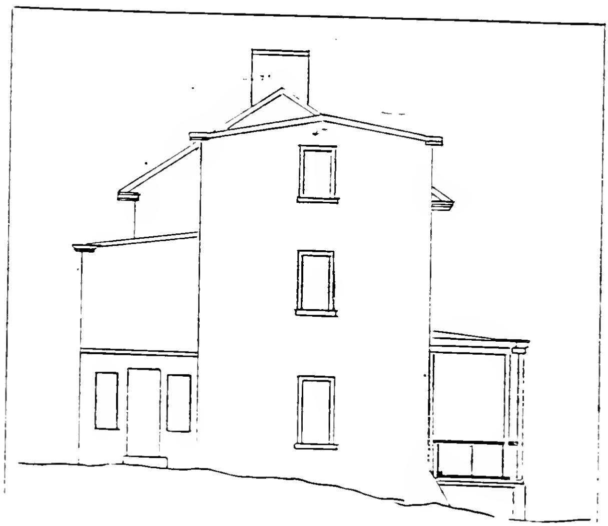
Rockland
1988
Third Floor Plan

sample site •   scale none

206
Lincoln Drive
Elevation

sample site •   scale 1/8" = 1'0"

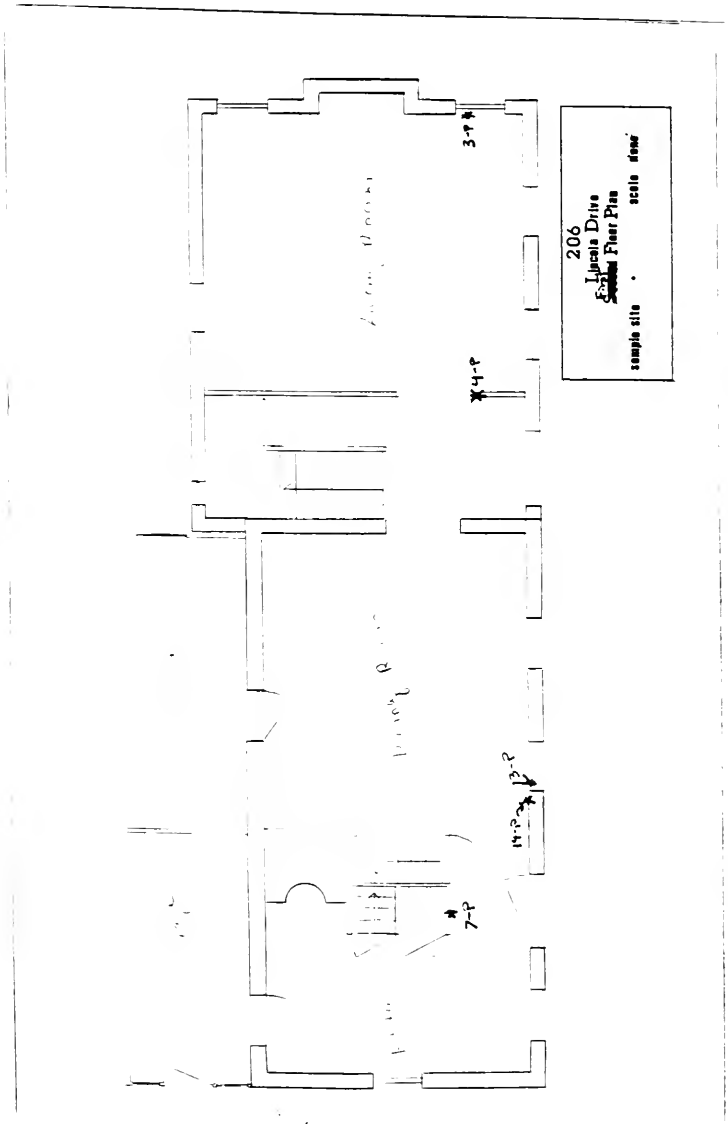
South Face



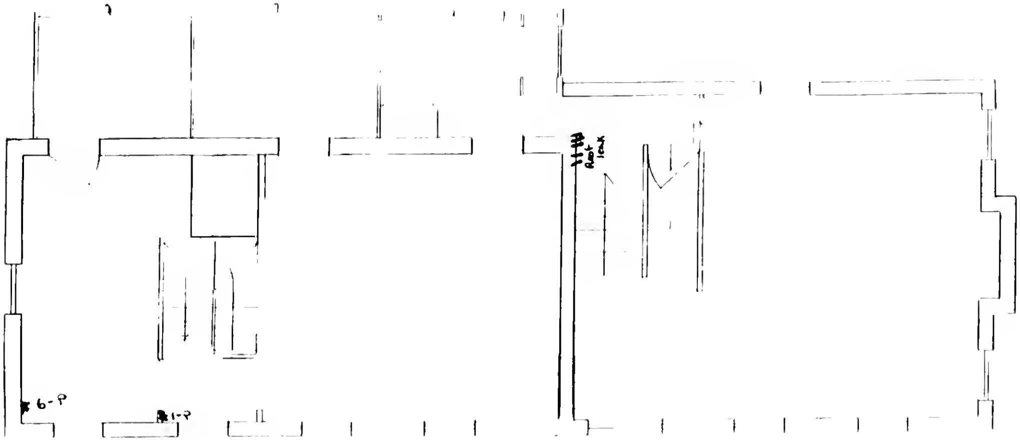
206
Lincoln Drive
Elevation

sample site • scale 1/8" = 1'0"

West Face

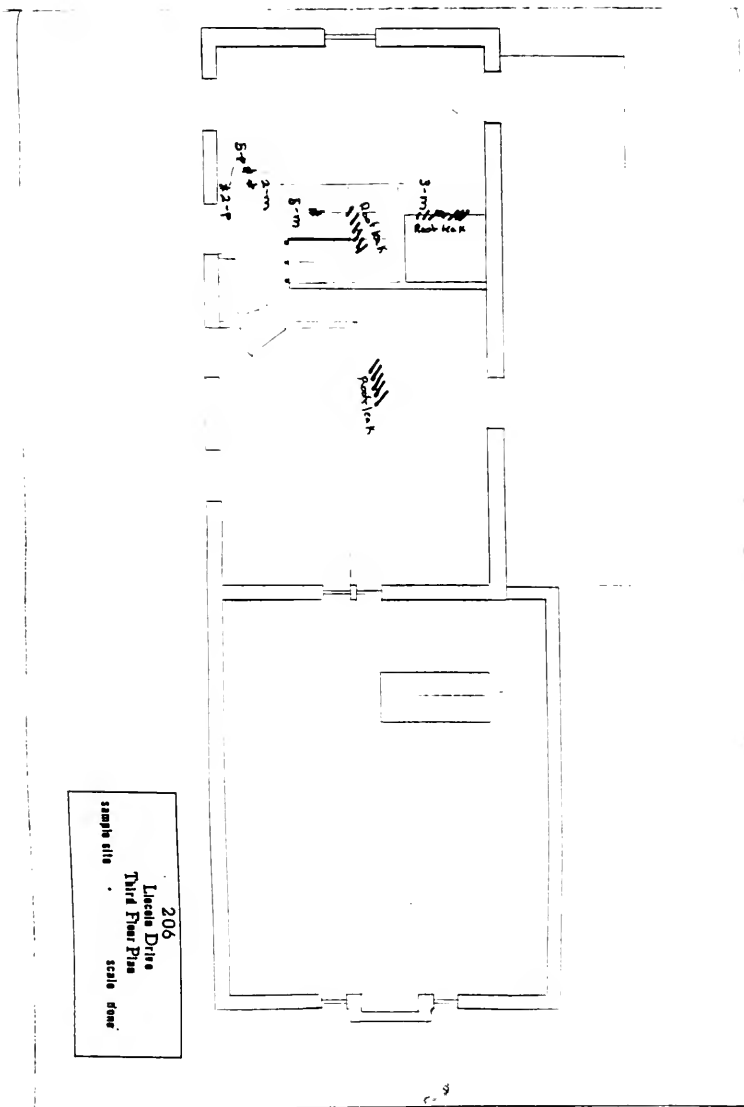


206
Lincoln Drive
First ~~Second~~ Floor Plan
sample site • scale none
3-P
4-P
3-P
14-P
7-P



206
Lincoln Drive
~~First~~ Second Floor Plan

sample site · scale none


206
Lincoln Drive
Third Floor Plan
sample site
scale none
Roof leak
Roof leak

<u>Appendix #3</u>

Chemical Test for Paint Analysis

List of Pigments With Chemical Names

The chemical test used in this study are from:

Gettens, Rutherford J. and George L. Stout. "The Stage Microscope in Routine Examination of Paintings" Technical Studies. Vol. IV, No. 4, April, 1936.

Plesters, Joyce. "Cross-section and Chemical Analysis of Paint Samples" In: <u>Studies in Conservation</u> Vol. [illegible], No. 3, April 1957. pp.110-155.

JOYCE PLESTERS

Cross-sections and Chemical Analysis of Paint Samples

Received 30/1/56

TABLES FOR IDENTIFICATION OF PIGMENTS Pages 134–155

N.B. A dash '—' under solubilities indicates that there is no visible effect after a few minutes' immersion in the reagent.

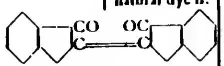
BLUE PIGMENTS.

Pigment	Chemical Composition	Origin, or date of invention	Appearance under low magnification	Solubilities: 3N HCl	Solubilities: 4N NaOH	Solubilities: HNO_3 (concentrated)	Effect of heat	Specific tests
Azurite (mountain blue, blue verditer).	Basic copper carbonate, $2CuCO_3.Cu(OH)_2$.	Natural mineral known from very early times.	Bright, slightly greenish blue crystalline fragments, often irregular in size and shape.	Very soluble, with effervescence of CO_2 to give a green solution.	Slow hydrolysis takes place with formation of black CuO on the surface of the pigment particles.	Very soluble, with effervescence of CO_2 to give a pale blue solution.	Black residue of copper oxide CuO.	(i) Dissolves in excess ammonia producing a deep blue solution of copper ammonia complex. (ii) Test for Cu^{++} with sodium diethyl-dithiocarbonate: 1 drop of the solution of pigment in HCl or HNO_3 is dropped on to filter paper and held over ammonia. A small drop of the reagent (a 0·1 % solution in water) is added. An orange-brown spot is formed if Cu^{++} is present. (Pb produces only a white turbidity, and interference by Fe^{+++} can be prevented by adding citric acid solution to the test drop before rendering it ammoniacal.) (iii) Test for Cu^{++} with rubeanic acid (dithio-oxamide): A drop of the acid solution of the pigment is placed on filter paper and held over ammonia. A drop of reagent (1% rubeanic acid in ethanol) is added. In the presence of Cu^{++} a greenish black coloration or precipitate is produced. (If the presence of Co^{++} is suspected, acetic acid is first added when the central greenish-black spot due to Cu^{++} will be surrounded by an orange zone due to Co^{++}.)

Blue bice	Basic copper carbonate, $2CuCO_3 \cdot Cu(OH)_2$	An artificially prepared substitute for Azurite; recipes for its manufacture are given from medieval times onwards	Usually more rounded and finer particles than those of Azurite.	As above.	As above.	As above.	As above.	As above.
Ultramarine, natural.	A complex compound of sodium aluminium silicate and sulphur, of somewhat variable composition, but approximating to $3Na_2O \cdot 3Al_2O_3 \, 6\,SiO_2 \, 2Na_2S$.	From the blue mineral Lapis Lazuli in which it occurs with calcspar and iron pyrites.	Clear, often slightly purplish blue crystalline particles of irregular size and shape. A few orange-red particles of iron pyrites are often seen, and white crystalline material, which viewed between crossed Nicol prisms proves to be the doubly refracting calcite	Becomes white and an effervescence of H_2S is produced (this can often be detected by smell).	—	Reacts quite slowly, the colour changing to pale yellow.	—	Tests for hydrogen sulphide evolved on treatment with hydrochloric acid: (i) Sodium-azide/iodine reagent: A drop of dilute acid is added to the pigment followed by a drop of the sodium azide/iodine reagent (1 g. sodium azide, 1 g. potassium iodide and a small crystal of iodine in 3 ml. of water). Bubbles of nitrogen rise to the surface and the orange colour of the reagent fades if sulphide is present (it remains in the absence of sulphide). (ii) The presence of H_2S may be ascertained by the blackening of lead acetate or sodium plumbite papers, or of a bright silver wire dipping into the drop. The reaction is best carried out in a cupslide covered with a glass coverslip to prevent escape of the H_2S.

BLUE PIGMENTS (*Contd*)

Pigment	*Chemical Composition*	*Origin, or date of invention*	*Appearance under low magnification*	*Solubilities* 3N HCl	*Solubilities* 4N NaOH	*Solubilities* HNO_3 (*concentrated*)	*Effect of heat*	*Specific Tests*
Ultramarine artificial.	As above but approximate formula $Na_{8-10}Al_6Si_6O_{24}S_{2-4}$. (See HARKER and RAITT [29] for modern views on structure.)	Manufacture first discovered by Guinet in 1828.	Usually smaller and more rounded pigment grains than those of lapis ultramarine. Moreover, there are few colourless particles and no doubly refracting calcite crystals, or particles of iron pyrites.	As above.	As above.	In samples examined in the National Gallery, artificial ultramarine seems to be attacked more rapidly. This does not seem to be wholly due to particle size. Most samples of the artificial pigment had become wholly pale yellow in less than half an hour, but the lapis variety was still blue after 2 hours.	—	As above.
Smalt	A potassium silicate glass coloured blue with cobalt oxide.	Manufactured. Eibner [27] reports it to be mentioned first in 1584.	By transmitted light, usually a rather pale blue. Very characteristic glassy fragments, often very coarse.	—	—	—	Melts at high temperatures.	The pigment can be got into solution by heating in a platinum spoon with sodium fluoride and a drop of concentrated sulphuric acid. The residue dissolved in a drop of water usually gives a fairly pink solution. This solution may be used for tests for Co^{++}: (i) Test for Co^{++} with α-nitroso-β-naphthol: (Reagent solution is 1 gm. of solid in 50 ml. glacial acetic acid diluted to 100 ml. with water.) 1 drop of test solution (neutral or weakly acid) is spotted onto filter paper and 1 drop of reagent added. The reagent alone gives a yellow spot, but if Co^{++} is present a

								deep orange-red spot appears in the centre. (If the presence of Fe^{+++} is suspected a few drops of a 10 % solution of trisodium phosphate should be added to the test drop as the pptd. ferric phosphate does not react with the reagent.) (ii) Test for Co^{++} with rubeanic acid: A spot of the test solution on filter paper is held over ammonia and then a drop of reagent (1 % in ethanol) added. In the presence of Co^{++} an orange-brown spot is formed (if Cu^{++} is also present this gives a greenish-black spot in the centre of the orange colour due to Co^{++}).
Indigo	The pure synthetic product and the principal constituent of the natural dye is: 	A blue dye from a plant. The plant contains a glucoside which on hydrolysis with acids gives the blue dyestuff and glucose. The synthesis of indigo was discovered in 1880 by Baeyer	Very dark blue, and of very fine particle size. The dyestuff seems to stain oil films.	Slowly turns brown on prolonged immersion, and partly dissolves.	Slowly turns brown on prolonged immersion and partly dissolves.	Decomposes to a dark brown precipitate.	With gentle heat sublimes with a purple vapour, then decomposes giving a brown distillate, dark fumes and a characteristic smell.	(i) Soluble in chloroform giving a deep blue solution, and partially soluble in white spirit giving a pinkish-mauve solution. (ii) Bleached by sodium hypochlorite solution.
Prussian Blue (Berlin Blue, Paris Blue, Antwerp Blue, Chinese Blue).	Ferric Ferrocyanide $Fe_4[Fe(CN)_6]_3$ (or a closely related compound).	A synthetic pigment invented by Diesbach in 1704.	Very dark blue and of very fine particle size. By transmitted light it is green-blue.	—	Goes into solution with precipitation of orange-brown ferric hydroxide.	—	Changes to a golden brown iron oxide still keeping its finely powdered form.	(i) If sufficient pigment is present it may be re-formed after being browned by NaOH by addition of excess hydrochloric acid. (ii) The precipitate of ferric hydroxide formed by treatment with NaOH may be dissolved in HCl and the presence of Fe^{+++} confirmed by addition of a few drops of ammonium thiocyanate solution. A red colour is produced. Where it is faint it may be concentrated by adding a drop of ether or amyl acetate to the solution, either of which solvents will extract the colour. The reaction is best carried out on a spot plate.

BLUE PIGMENTS (*Contd*)

Pigment	Chemical Composition	Origin, or date of invention	Appearance under low magnification	Solubilities: 3N HCl	Solubilities: 4N NaOH	Solubilities: HNO_3 (concentrated)	Effect of heat	Specific tests
Cobalt Blue (Thénard's Blue).	Cobalt aluminate, $CoO . Al_2O_3$	A synthetic pigment discovered by Thénard in 1802.	Pure blue rounded particles, moderately fine and of irregular size. Bright blue by transmitted light	—	—	—	—	The pigment may be got into solution by fusion in a platinum spoon with either sodium persulphate or a mixture of sodium carbonate and sodium peroxide. The melt is extracted with dilute nitric acid and the tests for Co^{++} given under 'Smalt' can be carried out on the solution. Al^{+++} may be precipitated as $Al(OH)_3$ from the solution by addition of sodium hydroxide.
Cerulean Blue.	Cobaltous stannate, $CoO . nSnO_2$	A synthetic pigment known as a chemical compound in the 19th century but not introduced as a pigment until 1860.	Green-blue, finely divided, rounded particles.	—	—	Sufficiently soluble, with heating, to give a pale blue solution.	—	The tests for Co^{++} mentioned under 'Smalt' may be applied to the solution in nitric acid, or if the specimen is not sufficiently soluble, to the solution obtained by the fusion treatment described under 'Cobalt blue'.

GREEN PIGMENTS.

Pigment	Chemical Composition	Origin, or date of invention	Appearance under low magnification	Solubilities: 3N HCl	Solubilities: 4N NaOH	Solubilities: HNO_3 (concentrated)	Effect of heat	Specific tests
Green Earth (terre verte).	Variable in composition; a complex hydrosilicate of Fe, Mg, Al and K. The green colour is caused by a small amount of Fe^{++}.	Known from earliest times as a natural mineral.	Usually coarse crystalline particles of a rather blue-green, some tinged with brown. Colourless particles are usually present also.	Partially soluble to give a pale greenish solution.	Partially soluble to give a greenish grey ppt. of $Fe(OH)_2$, which becomes brown on standing.	Soluble, giving a reddish solution.	Gradually turns golden brown.	(i) Tests for the presence of Fe^{+++} may be carried out on the solution of the pigment in conc. HCl: (*a*) $K_4[Fe(CN)_6]$ gives Prussian blue. (*b*) KCNS gives red ferric thiocyanate. (ii) Tests for Fe^{++} in the presence of Fe^{+++}: (*a*) The greenish ppt. of $Fe(OH)_2$ obtained by treatment with NaOH may be oxidized immediately to brown $Fe(OH)_3$ by addition of a drop of hydrogen per-

								(*b*) A drop of the acid test solution is placed on a spot plate lined with paraffin wax. The yellow Fe^{+++} solution is decolorized by adding a crystal or two of potassium fluoride ($Fe^{+++} \rightarrow K_3FeF_6$). A drop of α-α'-dipyridyl reagent (2% in ethanol is added). Fe^{++} produces a pink coloration.
Malachite (mountain green).	A basic copper carbonate, $CuCO_3 \cdot Cu(OH)_2$.	Known from earliest times as a natural mineral; often occurs in conjunction with azurite, *q.v.*	Crystalline fragments, a rather pale, blue-green in colour.	Soluble with effervescence of CO_2 giving a green solution.	Unaffected in the cold, but on warming, the particles partially dissolve giving a pale blue solution and they become coated with black CuO.	Soluble with effervescence of CO_2, giving a blue solution.	Black residue of CuO.	The solution in acid may be used for the tests for copper described under 'Azurite' (see 'Blue Pigments').
Verdigris	Usually the dibasic copper acetate, $Cu(CH_3COO)_2 \cdot 2Cu(OH)_2$.	Prepared from ancient times by corroding copper with vinegar.	Clear blue-green crystals, sometimes pointed needles. Colour often very strong.	Soluble giving a green solution.	Soluble, giving a pale blue pptt. of copper hydroxide which turns black on boiling.	Soluble giving a green solution.	Gives off a smell of acetic acid on warming (vapour turns Universal Indicator paper red). Further heating converts into black CuO.	(i) The tests for Cu^{++} described under 'Azurite' may be carried out on the solution of the pigment in dil. HCl, or HNO_3. (ii) Tests for acetate: (*a*) Warming with dil. H_2SO_4 usually yields a smell of acetic acid. (*b*) Addition of silver nitrate solution to a solution of the pigment in HNO_3 produces a white pptt. of silver acetate.
Transparent copper green.	Not strictly a pigment. A transparent green varnish is formed if a copper salt is dissolved in a resin such as Venice turpentine, when the Cu^{++} ion forms a salt with the resin acids, e.g. copper abietate	Laurie [1] claimed to have found this type of paint on illuminated manuscripts dating from the 8th century.	Clear rather grass-green when freshly prepared or in good preservation; when decayed becomes brown. On pictures it is sometimes mixed with lead white or litharge to give an opaque yellow-green.	Partly soluble giving a solution of $CuCl_2$.	Disintegrated, the resinous component being dissolved, and pale blue copper hydroxide being precipitated.	Soluble, giving a brown solution.	The resin usually gives off a characteristic resinous smell on warming, then the resinate melts and becomes brown. Finally an incombustible black residue of CuO remains.	The solution in acid usually contains sufficient Cu^{++} for the tests listed under 'Azurite' ('Blue Pigments') to be carried out.

BLUE PIGMENTS (Contd.)

GREEN PIGMENTS (Contd.)

Pigment	Chemical Composition	Origin, or date of invention	Appearance under low magnification	Solubilities: 3N HCl	Solubilities: 4N NaOH	Solubilities: HNO_3 (concentrated)	Effect of heat	Specific tests
Cobalt Green (Rinmann's green, zinc green).	A compound of cobalt oxide and zinc oxide of rather indefinite proportions. Probably there is a small proportion of CoO to ZnO.	A synthetic pigment discovered by Rinmann in 1780, but not used as a pigment until the nineteenth century.	Fine regular rounded particles, rather blue-green by reflected light, but pure green by transmitted light	Slightly soluble on heating, and more so with conc. HCl giving a pale pink solution.	—	Slowly soluble with heating to give a pale blue solution.	—	(i) Tests for Co^{++} listed under 'Smalt' ('Blue Pigments') may be made on the solution of the pigment in nitric acid. (ii) Test for Zn^{++} with dithizone: 1 drop of the test solution on a spot plate is made alkaline with 2N NaOH, a few drops of dithizone solution (10 mg. in 100 ml. of carbon tetrachloride) are added. The solution is stirred and the CCl_4 evaporated by blowing. A raspberry red solution (independent of precipitates present) indicates Zn (the test is specific for Zn in alkaline solution).
Chromium Oxide Green, opaque.	Anhydrous Chromic Oxide, Cr_2O_3.	Vauquelin, the discoverer of chromium, suggested the use of Cr_2O_3 in ceramic glazes in 1809, but it probably did not appear as an artist's pigment until some years later. [See Laurie (1).]	Rather dull olive green opaque granules, usually rather coarse; high refractive index.	—	—	—	—	The pigment can be got into solution by fusing with a mixture of sodium carbonate and sodium peroxide on a platinum spoon and dissolving the melt in a drops of conc. H_2SO_4. The chromium goes into solution as sodium chromate. Tests for chromium as chromate may be made on this solution: (i) Test for CrO_4^{--} with diphenylcarbazide: To a drop of test solution on a spot plate are added 1-2 drops of the reagent (1% diphenylcarbazide in ethanol). A violet colour is formed in the presence of chromate.

								(ii) Addition of a drop of $AgNO_3$ to a drop of the solution on a spot plate or filter paper gives a brick red pptt. of silver chromate. (iii) Lead acetate solution gives a yellow pptt. of $PbCrO_4$, soluble in HNO_3.
Viridian (Guignet's green).	Transparent hydrous oxide of Chromium $Cr_2O_3 . 2H_2O$.	Synthetic pigment first prepared by Pannetier in 1838. [See Church (30).]	Brilliant somewhat blue-green colour; particles usually large, irregular, slightly rounded, and exceptionally transparent. Refractive index is lower than that of the opaque oxide,	—	—	—	—	As above.
Chrome Green (Cinnabar Green).	A mixture of Prussian blue, $Fe_4[Fe(CN)_6]_3$ with chrome yellow, i.e. lead chromate $Pb\,CrO_4$.	Chrome Yellow was described by Vauquelin in 1809, so that the first manufacture of chrome green must be after this date.	Colour varies from grass green to blue-green. (The latter known as Cinnabar green.) The blue and yellow particles are often not distinguishable since the Prussian blue seems to coat the yellow particles.	The lead chromate is dissolved with pptn. of white lead chloride. The Prussian blue is unchanged, so that the colour of the sample changes from green to blue.	The Prussian blue is dissolved with pptn. of orange-brown ferric hydroxide, so that the colour of the sample changes from green to brownish yellow.	Partly soluble; the lead chromate dissolves to give a yellow solution, the Prussian blue remains unchanged.	Turns yellow-brown owing to the formation of ferric oxide.	(i) Tests for CrO_4^{--} listed under 'Chromium oxide green-opaque' may be made on the sample treated with acids. (ii) Tests for Pb^{++} may be made under the same conditions (these tests are listed under 'Lead White') see 'White Pigments and Inerts'. (iii) See 'Prussian Blue' ('Blue Pigments') for tests for this pigment.

GREEN PIGMENTS (*Contd.*)

Pigment	*Chemical Composition*	*Origin, or date of invention*	*Appearance under low magnification*	*Solubilities* 3N HCl	*Solubilities* 4N NaOH	*Solubilities* HNO_3 (*Concentrated*)	*Effect of heat*	*Specific tests*
Scheele's Green.	Copper-hydroarsenite, $CuHAsO_3$ (but composition varies with mode of preparation).	A synthetic pigment invented by Scheele in 1778.	Bright lime-green irregularly shaped flakes of varying size. Rather opaque.	Soluble giving a green solution.	Soluble with formation of a pale blue pptt. of $Cu(OH)_2$.	Soluble giving a blue solution.	Black residue of CuO.	(i) Tests for Cu^{++}, as listed under 'Azurite' (see 'Blue Pigments') may be made on the solution in dil. acid. (ii) Tests for As: (*a*) The pigment is dissolved in conc. HCl and a drop or two of saturated stannous chloride solution added. The mixture is then warmed. Arsenic is precipitated as a blackish brown solid (the Cu^{++} is reduced to colourless cuprous chloride and does not interfere). (*b*) A drop of the test solution (or a few grains of pigment) is warmed in a platinum crucible with a drop or two of ammonia and of hydrogen peroxide (10 %). It is then acidified with acetic acid and 1-2 drops of $AgNO_3$ solution (1 %) added. A red-brown pptt. of silver arsenate is formed in the presence of As. (Since chromates interfere, the absence of 'Chrome Green' (*q.v.*) must be proved before this test is made.)
Emerald Green (Schweinfurt Green, Paris Green, Veronese Green.)	Copper aceto-arsenate. $Cu(CH_3COO)_2 \cdot 3Cu(AsO_2)_2$	A synthetic pigment first made at Schweinfurt, Germany, in 1814.	Distinctive brilliant bluish-green, small rounded grains, some with the appearance of being trefoil or quatrefoil in shape, probably owing to a depression in their centres.	As above, but an almost colourless solution.	As above.	As above.	As above.	As above.

Vermilion (Cinnabar).	Red mercuric sulphide, HgS.	Occurs as a natural mineral cinnabar, but has been synthesized from early times.	Very deep red by transmitted light. Pigment size and crystallinity vary; natural and synthetic varieties are not distinguishable.	—	—	Very slightly soluble.	No change at moderate temperatures but sublimes at 580° C.	(i) Test for Hg^{++}: The pigment may be dissolved in a platinum spoon by repeated treatment with hot HCl. The residue is redissolved in a drop of dil HNO_3. 1 drop of this solution is placed on filter paper impregnated with freshly prepared diphenyl carbazone reagent (1 % in ethanol). A violet-blue fleck indicates Hg^{++}. (ii) Test for Sulphide: On the solid pigment is placed a drop of sodium azide/iodine reagent. Bubbles of gas (nitrogen) rise to the surface if sulphide is present and the yellow colour of the reagent fades.
Iron oxide reds (Red ochre, Indian red, Venetian red, light red, haematite, Mars red, etc.).	Iron oxide, either anhydrous, Fe_2O_3 or hydrated $Fe_2O_3 \cdot nH_2O$	Occur widely as natural minerals, also made artificially (the Mars colours.	Some varieties (e.g. haematite) are transparent and red by transmitted light. Others are quite opaque. It is difficult to distinguish the artificial varieties from the natural.	Some specimens are slightly soluble.	—	Partly soluble.	—	The pigment is soluble in concentrated HCl giving a yellow solution of $FeCl_3$. Tests for Fe^{+++}: (i) Potassium ferrocyanide gives a pptt. of Prussian blue. (ii) Potassium thiocyanate gives a blood red coloration.
Red lead (minium).	Lead tetroxide, Pb_3O_4.	Orange-red, finely divided, may be crystalline or amorphous.	Artifically made, but known from antiquity.	Dissolves with pptn. of white $PbCl_2$.	—	A brown pptt. of lead dioxide is formed.	—	Tests for Pb on soln. in HNO_3: (i) 1 drop of dil. HCl and 1 drop of KI solution gives a yellow pptt. of PbI_2, which after warming recrystallizes in golden 'spangles'. (ii) 1 drop of dil HCl plus 1 drop of K_2CrO_4 solution gives a yellow pptt. of $PbCrO_4$.

Red and Violet Pigments (*Contd.*)

Pigment	*Chemical composition*	*Origin, or date of invention*	*Appearance under low magnification*	*Solubilities* 3N HCl	*Solubilities* 4N NaOH	*Solubilities* HNO_3 (*concentrated*)	*Effect of heat*	*Specific tests*
Dragon's blood	A natural resin (for chemical composition see Robertson and Whalley [31])	From a tree in East Asia; known in medieval times (See Thompson [32]).	Dark red by reflected light but clear orange-red by transmitted light.	Partly soluble, giving a yellow solution.	Partially dissolves to an orange-red turbid solution.	Disintegrates to a dark brown mass.	Melts then evolves benzoic acid (characteristic smell). See Gettens and Stout [26].	Soluble in alcohol, benzene and chloroform to give bright red solutions.
Madder Lake (Crimson madder).	A mixture of two hydroxy-anthraquinone dyestuffs, alizarin and purpurin, mordanted on to a base which is usually $Al(OH)_3$.	Extracted from the root of the madder plant.	Usually a very fine powder, crimson red in colour. In oil films the separate particles cannot be seen owing to the transparency of the $Al(OH)_3$.	The $Al(OH)_3$ partly dissolves and the colour of the pigment becomes more orange.	Soluble, giving a purplish solution.	Decomposes to a dark brown solution.	Colour changes to purple brown, then black and finally only a pale grey ash of Al_2O_3 remains.	(i) Tests for the dyestuff: (*a*) On addition of excess dil. H_2SO_4 the $Al(OH)_3$ base is dissolved and a flocculent ppt. of the dyestuff formed, orange in colour. (*b*) Natural madder lakes often fluoresce whitish in u.v. owing to the presence of purpurin. (ii) Test for $Al(OH)_3$, with Morin reagent: The paint fragment is treated with NaOH which dissolves out the medium and the $Al(OH)_3$. 1 drop of the Morin reagent (satd. solution in methanol) is placed on filter paper and dried. 1 drop of the test solution is added and the paper again dried. On addition of a drop of dil HCl the spot fluoresces yellow-green in u.-v. (A blank test should be done with the reagents.)
Alizarin crimson.	A single hydroxy-anthraquinone dyestuff, alizarin, on a base of $Al(OH)_3$.	Synthesized for the first time in 1868 by Graebe and Lieberman.	As above.	As above.	As above.	As above.	As above.	As above, except that in the case of test (i) (*b*), the absence of purpurin means that there is no fluorescence under u.v. light.

Brown Madder (burnt madder)	Madder or alizarin charred by heating.	See above.	As above, but a dull brownish or purplish red.	As above.	As above.	See above.	As above.	See above.
Cobalt Violet, dark.	Anhydrous cobalt phosphate $Co_3(PO_4)_2$.	Preparation described in 1859 by Salvétat.	Irregular particles, red-violet in transmitted light and highly refracting.	—	—	Somewhat soluble.	—	(i) Tests for Co listed under 'Smalt' (see 'Blue Pigments') can be made on the solution in aqua regia. (ii) Tests for Phosphate: A few grains of pigment are placed on filter paper, moistened with a drop of ammonium molybdate solution and warmed over a flame. A drop of benzidine solution (0·05 g. base or chloride in 10 ml. conc. acetic acid, then diluted with water to 100 ml.) is added and the moist fleck held over NH_3. A brilliant blue colour forms around the sample.
Cobalt Violet, light.	Anhydrous cobalt arsenate, $Co_3(AsO_4)_2$.	Appeared about 1880 (see Eibner [27]).	As above.	—	—	—	—	Tests for Co^{++}: (i) As above. (ii) Test for Arsenate: see tests under Scheele's Green ('Green Pigments').
Manganese Violet (Nürnberg Violet, Permanent Violet).	Fusion product of manganese dioxide and ammonium phosphate.	Prepared first by E. Leykauf in 1868.	Rounded granules of rather irregular size, bright red-violet by reflected light, but pale transparent mauve by transmitted light	On heating gradually turns black with evolution of Cl_2.	Black ppt. of MnO_2.	—	Greyish residue.	Test for Mn: The sample of pigment is mixed with solid Na_2CO_3 and potassium nitrite (KNO_3) and fused on platinum foil. A green mass of alkali manganate is formed. This is soluble in water, and on standing is oxidized to purple alkali permanganate.

Yellow and Orange Pigments

Pigment	Chemical composition	Origin, or date of invention	Appearance under low magnification	Solubilities: 3N HCl	Solubilities: 4N NaOH	Solubilities: HNO_3 (concentrated)	Effect of heat	Specific tests
Yellow Ochre (Golden Ochre, Mars Yellow).	Hydrated iron oxide, $Fe_2O_3 \cdot H_2O$. The natural ochres may contain aluminium silicate and other impurities	Natural minerals are widely distributed, but an artificial variety (Mars yellow) is also made.	Usually very small regular grains, a rather dull golden yellow by reflected light.	Some samples are slightly soluble, giving a yellow solution of $FeCl_3$	—	Partly soluble, giving a yellow solution.	Turns brown-red on loss of combined water.	Soluble in hot concentrated HCl giving a yellow solution of $FeCl_3$. The tests for iron given under 'Green Earth' (see 'Green Pigments') may be carried out on this solution.
Massicot and Litharge.	Principally lead monoxide PbO, but litharge usually contains a little red lead, Pb_3O_4.	Manufactured pigments known from antiquity. Massicot is the unfused oxide made by roasting lead white; litharge is the fused oxide made by oxidation of molten lead. (See Gettens and Stout [24].)	Usually of fine almost amorphous texture like lead white. Massicot is pale yellow, litharge a little more orange, owing to the presence of red Pb_3O_4.	Soluble with pptn. of white $PbCl_2$.	Soluble on heating, as sodium plumbite.	Readily soluble.	Unaffected at moderate temperatures. Changes to red Pb_3O_4 if heated above 400° C.	The solution in acids may be used to carry out any of the tests for lead given under 'Red Lead' (see 'Red Pigments').
Orpiment (King's Yellow)	Yellow arsenic sulphide, As_2S_3.	Natural mineral, used from antiquity.	Bright golden yellow; occurs in small flakes or in fibrous masses, has a glossy or waxy looking surface.	On heating goes into solution with evolution of H_2S.	Soluble giving sodium arsenate and sulpharsenites.	Soluble (decomposes to give As and H_2SO_4).	Sublimes, then becomes colourless owing to oxidation to the trioxide As_2O_3.	(i) Tests for As listed under 'Scheele's Green' (see 'Green Pigments') may be carried out on the solution in alkali. (ii) Test for Sulphide: The sodium azide/iodine test given for Vermilion (see 'Red Pigments') may be made on the solid pigment.

Realgar.	Orange-red arsenic sulphide As_2S_2	Natural mineral often occurring with Orpiment.	Similar to above, but more orange. By transmitted light, orange-red. It has a slightly lower R.I. than Orpiment.	As above.	Soluble.	As above.	Melts at 310°C.	As above.
Naples Yellow (Antimony Yellow).	Lead antimonate, $Pb_3(SbO_4)_2$.	Manufactured pigment whose history is obscure. (See Gettens and Stout [24].)	Very fine granules, like Massicot in appearance. It is difficult to see a crystalline form. Colour varies from lemon-yellow to orange-yellow.	Partially sol. with white $PbCl_2$ pptd.	Partially sol.	Soluble.	Sublimes with an orange-yellow vapour.	(i) Test for Antimony: 1 drop of the solution of the pigment in HCl is treated with 1 drop of conc. H_2SO_4 on platinum foil and a zinc filing added, and allowed to stand for 5–30 min. with the Zn and Pt in contact. The platinum darkens when Sb is present, and the element separates on the platinum in black plates. (As gives mainly gaseous hydride, Sn gives a grey deposit only.) (ii) Tests for Pb: under 'Red Lead' (see 'Red Pigments').
Chrome Yellow.	Lead chromate $Pb\,CrO_4$.	Preparation described by Vauquelin in 1809.	Brilliant yellow; particle size varies; usually very fine crystals; rather opaque.	Soluble, with pptn. of white $PbCl_2$ and an orange solution of chromic acid.	Soluble giving a yellow solution of alkali chromate.	Soluble giving a yellow solution.	—	(i) Tests for Pb^{++}: Those listed under Red Lead (see 'Red Pigments') may be employed with the solution of the pigment in acid. (ii) Tests for CrO_4^{--}: These may be found under 'Chromium Oxide Green, Opaque' (see 'Green Pigments') and may be carried out on the solution of the pigment in acid.
Barium Yellow.	Barium chromate, $BaCrO_4$.	As above.	By reflected light, bright lemon yellow; by transmitted light, nearly colourless; fine xn. structure.	Soluble, giving a yellow solution.	Soluble, giving a yellow solution.	Soluble, giving a yellow solution.	—	(i) Tests for Ba^{++}: (*a*) To a solution of pigment in HCl or HNO_3 is added H_2SO_4; a white pptt. of insoluble $BaSO_4$ is formed. (*b*) Flame test gives a pale green flame. (ii) Tests for CrO_4^{--}, see 'Chrome Yellow', above.

Yellow and Orange Pigments (Contd)

Pigment	Chemical Composition	Origin, or date of invention	Appearance under low magnification	Solubilities: 3N HCl	Solubilities: 4N NaOH	Solubilities: HNO_3 (concentrated)	Effect of heat	Specific tests
Strontium Yellow (Lemon Yellow).	Strontium chromate, Sr CrO_4.	As above.	A little stronger yellow than $BaCrO_4$. Finely divided crystalline mass consisting of needles.	As above.	As above.	As above.	—	(i) Tests for Sr^{++}: (*a*) Addition of H_2SO_4 to the acid test drop gives a white pptt. of insol. $SrSO_4$. (*b*) Flame test gives a crimson flame. (ii) Tests for CrO_4^{--}: see 'Chrome Yellow'. (iii) Test with Sodium Rhodizonate for distinguishing between Barium and Strontium in lemon yellows: 1 drop of the neutral test solution is spotted on filter paper and 1 drop of the reagent (0·2 % aq.) added. Ba^{++} and Sr^{++} both give a red-brown spot, but the colour due to Sr^{++} disappears with 1 drop of dil. (1 in 20) HCl, the Ba^{++} cmpd. remaining as a bright red spot.
Cobalt Yellow (Aureolin).	Potassium cobaltinitrite, $CoK_3 . (NO_2)_6 . H_2O$.	Discovered by N. W. Fisher in 1848.	Small crystals and clusters of crystals, yellow by transmitted light.	Slightly soluble giving a yellow solution.	Slightly soluble.	Soluble, giving an orange solution.	When heated strongly, gives black CoO, and oxides of nitrogen.	The residue from combustion can be dissolved in dil HCl or HNO_3 and the solution used for tests for Co^{++} listed under 'Smalt' (see 'Blue Pigments').
Cadmium Yellow.	Cadmium Sulphide, CdS	A synthetic pigment prepared by pptn (a mineral form exists but there is no record of its ever having been used as a pigment). First observed by Stromeyer in 18[illegible]	Colour varies from lemon yellow to orange, probably according to particle size, the orange usually being coarser. All types are, however, comparatively finely divided.	Insoluble in the cold; partly soluble on heating, with evolution of H_2S.	—	Soluble, with evolution of H_2S.	At high temperatures brown CdO is produced.	(i) Test for Cd^{++} with di-p-nitrophenylcarbazide: A drop of the test solution is mixed on a spot plate with a drop of NaOH (10 %) and of KCN (10 %), a drop of reagent (0·1 % alcoholic solution of di-p-nitrophenylcarbazide) and two drops of formaldehyde (40 %). In the presence of Cd^{++} a blue-green pptt. or colour is formed. The reagent alone [illegible]

								gives a violet colour with formaldehyde. The colour should be compared with a blank using the reagents only. (ii) Test for Sulphide: The sodium azide/iodine test described under 'Vermilion' (see 'Red Pigments') can be used with the solid pigment.
Brown and Black Pigments.								
Raw Sienna	Hydrated ferric oxide, $Fe_2O_3 . H_2O$.	Natural mineral.	By reflected light, a golden-brown; by transmitted light, a mixture of transparent yellow, red-brown and colourless particles can be seen, as well as opaque brown ones.	Slightly soluble, especially on heating. (Usually sufficient to give a blue colour with $K_4Fe(CN)_6$.)	—	Partly soluble.	Colour changes to the darker warmer brown of Burnt Sienna (see below), the anhydrous oxide.	The pigment will dissolve in hot concentd. HCl giving a yellow solution. The tests for iron may be carried out on this solution which are listed under 'Green Earth' (see 'Green Pigments').
Burnt Sienna.	Anhydrous Ferric Oxide, Fe_2O_3.	Prepared by calcining Raw Sienna.	Most of the grains are reddish brown. No visible crystalline form.	As above.	—	As above.	—	As above.
Raw Umber.	Hydrated Ferric Oxide $Fe_2O_3 . H_2O$ with a proportion of Manganese dioxide MnO_2. (from 8-16 %.)	Natural mineral.	Fine darkish yellow-brown grains mainly, but some orange, yellow and colourless particles.	As above.	—	As above.	Loses water to become the anhydrous oxide Burnt Umber (see below) which is a darker, redder brown.	(i) Tests for Fe^{+++} as for Raw Sienna. (ii) Tests for Mn: (*a*) Catalytic oxidation to permanganate: A little of the pigment or a drop of its solution in HNO_3 (Cl^- must be absent) is mixed with a drop of conc. H_2SO_4 in a platinum spoon. A drop of $AgNO_3$ solution (0·1 %) is stirred in, followed by a milligram or two of ammonium persulphate. The mixture is gently heated. In the presence of Mn a red-violet colour due to the permanganate is formed.

BROWN AND BLACK PIGMENTS (*Contd.*)

Pigment	*Chemical composition*	*Origin, or date of invention*	*Appearance under low magnification*	*Solubilities* 3N HCl	*Solubilities* 4N NaOH	*Solubilities* HNO_3 (*concentrated*)	*Effect of heat*	*Specific tests*
Burnt Umber.	Anhydrous ferric oxide Fe_2O_3, with a proportion of manganese dioxide, MnO_2	Prepared by gently heating Raw Umber.	As above, but a little darker, redder brown in colour, and slightly more transparent.	As above.	—	As above.	—	(i) Tests for Fe^{+++}, as for Raw Sienna. (ii) Tests for Mn, as above.
Bitumen (asphaltum, mummy, bistre).	A mixture of hydrocarbons with organic and inorganic impurities and of variable composition. (See Church [30] and Gettens and Stout [24])	Bitumen or asphaltum occurs as a semi-liquid mineral deposit. Mummy is a pigment made from the asphaltum used to embalm Egyptian mummies. Bistre is a tarry material from burned wood.	Dark brown amorphous solid, semitransparent and orange-brown by transmitted light. It is partially soluble in oil media giving a translucent brown film.	—	Soluble, giving an orange-brown solution.	Soluble, giving a red-brown solution.	At first melts to a black tarry liquid. Dense yellow-brown fumes are then produced, with a pungent, tarry odour, and a brown distillate collects at the mouth of the ignition tube. Finally only a very small residue of incombustible inorganic matter remains.	(i) At least part of the material is soluble in benzene, petroleum ethers and other organic solvents. (ii) The incombustible residue usually gives a positive test for iron (see tests for Fe^{+++} under 'Green Earth', 'Green Pigments').
Van Dyck Brown (Cassell Earth, Cologne Earth).	Consists of as much as 90 % of organic matter (hydrocarbons similar to those of Bitumen), together with iron oxide, alumina, silica, etc.	A mineral deposit similar to Lignite.	As above, but of a more heterogeneous appearance, and with granules of inorganic brown pigment.	—	As above.	As above.	As above, but leaves rather more incombustible residue	As above.

Carbon Black (Charcoal black, lamp black, vine black, graphite).	Consists primarily of carbon as the free element. Impurities vary as to sources, e.g. lamp black contains hydrocarbons.	Except for graphite, which is a natural mineral (but can also be prepared artificially), carbon blacks are all produced by the partial combustion of organic materials such as wood and oil. Most forms were known from earliest times.	Except for graphite, which is in the form of flaky grey-black crystals, all these pigments are black or blackish brown opaque amorphous materials. The particle size varies greatly; lamp black is very fine, whereas charcoal is often seen as rather coarse jagged chips; yet other forms are granular.	—	—	—	Can be almost completely burnt in air (except for minute amounts of inorganic impurities).	Not necessary.
Bone black (Ivory black, Animal black).	Contains as little as 10 % carbon, the remainder being mainly calcium phosphate $Ca_3(PO_4)_2$ with a little calcium carbonate.	Obtained by charring animal bones (or tusks) in a restricted air supply.	The carbon seems to be mixed in a very fine state with the calcium phosphate, and the general appearance is of translucent blackish brown grains of rather irregular shape, but with no separate black and white particles.	—	—	—	A white residue of calcium salts remains after combustion.	(i) For Ca^{++}: (*a*) The incombustible residue gives a bright red flame test. (*b*) The incombustible residue is soluble in dilute acids, but on adding $(NH_4)_2CO_3$ in excess a white ppt. of $CaCO_3$ is formed. (ii) Tests for PO_4^{---}: The ammonium molybdate/benzene test given for 'Cobalt Violet, dark' (see 'Red and Violet Pigments') may be applied to the incombustible residue.

White Pigments and Inerts.

Chalk (Whiting, Lime-white).	Calcium carbonate $CaCO_3$	Natural deposit.	Fine white or whitish powder: Low R I.	Dissolves with effervescence of CO_2.	—	Dissolves with effervescence of CO_2.	None until very high temperatures when CaO formed.	(i) On heating with dil. H_2SO_4 and evaporating to dryness, recrystallization of the residue from dil. HCl gives characteristic 'wheat-sheaf' formations of needles of gypsum, $CaSO_4 \cdot 2H_2O$. (ii) A flame test gives the brilliant red colour caused by Ca.

WHITE PIGMENTS AND INERTS (*Contd*)

Pigment	*Chemical composition*	*Origin, or date of invention (if after 1700)*	*Appearance under low magnification*	*Solubilities*			*Effect of heat*	*Specific tests*
				3N HCl	4N NaOH	HNO_3 (*concentrated*)		
Gypsum.	Calcium sulphate dihydrate, $CaSO_4 \cdot 2H_2O$.	Natural deposit.	Usually fine granular crystalline mass.	Moderately soluble.	—	Moderately soluble.	At 110° C. loses water of crystallization (giving plaster of Paris). Water vapour condenses at the top of the tube.	(i) On dissolving in dil. HCl and allowing to crystallize out, characteristic 'wheatsheafs' of gypsum needles are formed. (ii) Flame test for Ca. (iii) To test for SO_4^{++}, boil the sample with dil. HCl, filter off and add $BaCl_2$ solution to the filtrate. A white insoluble ppt. of $BaSO_4$ is formed if sulphate is present.
Anhydrous Calcium Sulphate (anhydrite).	$CaSO_4$.	Prepared by calcining gypsum.	Fine white powder.	Moderately soluble, but less so than gypsum.	—	Moderately soluble.	No effect; with a dry sample no water vapour is given off on heating.	(i) (ii) and (iii) as above. (iv) To distinguish from gypsum by the hydrated form's slightly greater solubility in water place a grain or two of the solid on a spot plate, add 2-3 drops of 4% Na_2CO_3 solution reddened with phenolphthalein. Stir the ppt. with a platinum wire. Gypsum decolorizes the solution in 4-5 min., the anhydrite in 15-45 min. (*N.B.*—Analysis of gesso inerts are best done by X-ray crystallography methods.)
Lead white.	Basic lead carbonate, $2PbCO_3 \cdot Pb(OH)_2$.	Artificially prepared from very early times.	Fine white powder (individual grains and crystallinity only seen at very high power).	Soluble, giving a white ppt. of $PbCl_2$, soluble on heating.	Partially soluble as sodium plumbite.	Soluble.	Turns yellow owing to the formation of Massicot (lead monoxide, PbO).	Tests for Pb^{++} are given under Red Lead (see 'Red Pigments') and can be carried out with the solution of the pigment in HNO_3 (dilute).

Zinc white (Chinese white)	Zinc oxide, ZnO.	Artificially prepared. The use of ZnO as a pigment was first suggested in 1782.	Very finely divided white powder.	Completely soluble, with no effervescence.	Soluble as sodium zincate.	Completely soluble with no effervescence.	Turns yellow on heating but becomes white again on cooling.	(i) Not blackened by H_2S, since ZnS is white. (ii) Test for Zn with dithizone: 1 drop of the solution in NaOH is mixed on a spot plate with a few drops of dithizone solution (10 mg. dithizone to 100 ml. CCl_4). The CCl_4 is evaporated while stirring. A raspberry red colour shows the presence of Zn. (The test is specific for Zn in alkaline solution.)
Metals used as Pigments.								
Gold.	Metallic element, Au.	Known from antiquity.	Colour varies, with the degree of purity being sometimes pinkish and sometimes yellowish. Bright metallic sheen which does not tarnish. Used as thinly beaten sheets or 'leaves' laid down on the picture surface, or as a powder like an ordinary pigment.	—	—	—	—	Soluble in aqua regia (3 conc. HCl/1 conc. HNO_3), and unattacked by any other reagents. The following tests may be made on the solution: (i) Test for Au with benzidine: A drop of the test solution and a drop of benzidine reagent (0·05 % in 10 % acetic acid) are spotted on to filter paper. In the presence of Au a blue colour is formed. (ii) Test for Au with Rhodamine B: 1 drop of solution in aqua regia is mixed on a spot plate with 1 drop of reagent (0·01 g. in 100 ml. water). The solution is stirred with a few drops of benzene. If Au is present the benzene layer becomes red-violet to pink, and after 1 min. fluoresces orange under u.-v. light.

METALS USED AS PIGMENTS (*Contd.*)

Pigment	*Chemical composition*	*Origin, or date of invention*	*Appearance under low magnification*	*Solubilities*			*Effect of heat*	*Specific tests*
				3N HCl	4N NaOH	HNO_3 (*concentrated*)		
Silver.	Metallic element, Ag.	Known from antiquity.	When untarnished has a white metallic sheen, but rapidly discolours in an impure atmosphere, owing to the formation of a film of black sulphide.	Very slight solvent action.	—	Dissolves with evolution of nitrogen oxides (brown fumes with characteristic odour).	—	(i) To the solution in HNO_3 is added dil. HCl. A white ppt. of $AgCl_2$ is formed, darkening on exposure to light and soluble in excess NH_3. (ii) Addition of K_2CrO_4 to the test solution produces a ppt. of brick-red silver chromate, Ag_2CrO_4. (The reaction is best seen on a spot plate.) (iii) Test with *p*-dimethylamino benzylidene rhodamine: A drop of the neutralized test solution is stirred on a spot plate with a drop of KCN solution (10 % aq.). A drop of the reagent (0·03 % in ethanol) is added followed by dil. HNO_3 until the mixture is acid. A pink colour indicates Ag. (Under these conditions Au does not give a coloured compound.)

Tin.	Metallic element, Sn.	Known from antiquity and sometimes used on pictures in the Middle Ages.	Lustrous white metal, untarnished by air and water.	Dissolves rather slowly in the diluted acid.	Dissolves very slowly on heating forming sodium stannate, Na_2SnO_3.	A film of hydrated stannic oxide becomes formed on the surface of the metal, and the action slows down and stops.	—	The metal dissolves quite rapidly in conc. HCl, forming stannous chloride. This solution can be used for the following tests for Sn: (i) With ammonium phosphomolybdate: Filter paper impregnated with a solution of phosphomolybdic acid is held over NH_3 until yellow ammonium phosphomolybdate is formed and then dried. A drop of the test solution produces a blue spot if Sn is present. (ii) Test with Cacotheline: Filter paper is impregnated with a satd. aq. solution of the reagent. A drop of the test solution is added before the paper is quite dry. According to the amount of Sn a red circle or ring is formed on the paper coloured yellow by the reagent, surrounded by a colourless zone.

Reprinted from TECHNICAL STUDIES, Vol. IV, No. 4, April, 1936
Printed in U. S. A.

THE STAGE MICROSCOPE IN THE ROUTINE EXAMINATION OF PAINTINGS

By RUTHERFORD J. GETTENS and GEORGE L. STOUT

Technical study of paintings as this may be carried out for the purposes of historical research, museum record, care, and treatment, has to do with a large number of questions about the materials which make up these works of art.[1] Some such questions will have to go without an answer and others will have to be referred to specialists for a type of investigation which may not be suitable to a museum laboratory. There are many, however, which can be answered with relative ease and often with entire certainty by the museum examiner when he can take specimens from the painting and study them with a stage microscope.

Examination of specimens naturally can not displace the surface examination which is carried out by eye and with a binocular microscope, and often it can do no more than corroborate what has been found out by established optical means such as radiography, photography by infra-red radiations, and observations by ultra-violet light. Specimens from a picture are studied for the purpose of answering very specific questions about materials, their constitution, or their behavior in response to solvents or reagents. These are questions which could not be answered by study of the painting itself. For the curator, the student, or the conservator, analysis needs to be kept down to rudimentary tests which can be quickly made and which are calculated to help in reaching conclusions important to the purpose at hand. The tests that are suggested here, as the result of some experience, will have to be selected according to that purpose, and all

[1] An outline for recording the results of a general technical examination has already been suggested by a committee of the American Association of Museums (see 'A Museum Record of the Condition of Paintings,' *Technical Studies*, III [1935], pp. 200–216).

Reagents [3] (Distilled water)

Acids—Hydrochloric acid, concentrated

Hydrochloric acid, dilute (1 vol. conc. acid to 5 vols. water)

Nitric acid, concentrated

Nitric acid, dilute (1 vol. conc. acid to 7 vols. water)

Sulphuric acid, dilute (1 vol. conc. acid to 10 vols. water)

Alkalies—Ammonia, dilute (1 vol. conc. ammonia to 5 vols. water)

Sodium hydroxide, dilute (5 g. NaOH to 100 cc. water)

Salts—Potassium iodide (powdered crystals)

Potassium ferrocyanide (powdered crystals)

Potassium mercuric thiocyanate (crystals) [4]

Organic Solvents [5]

Ethyl alcohol (95 per cent)

Acetone

Ethylene dichloride

Xylene (xylol)

Naphtha (V M & P)

Mounting Mediums

Glycerine and water (1 : 1) for temporary mounts

Canada balsam for permanent mounts

[3] The strong acids should be kept in small, capped bottles provided with a ground-in glass stopper which is drawn to a fine point for dropping. The dilute liquid reagents and organic solvents may be contained in small dropping bottles with ground-in pipette and rubber bulb. (In order to keep the stopper of the sodium hydroxide solution from being 'frozen,' it is well to put a film of paraffin or grease around it.) Dry reagents can be kept in small salt bottles.

[4] Potassium mercuric thiocyanate is not easily obtainable and it may have to be specially prepared in a chemical laboratory. Directions for making it are given by Chamot and Mason (*Handbook of Chemical Microscopy* [New York: John Wiley and Sons, 1931], II, 394) as follows: 'Dissolve 3 to 5 parts of KSCN (potassium thiocyanate) and 1 part of $Hg(SCN)_2$ (mercuric thiocyanate) in a minimum quantity of water and evaporate in a desiccator. Collect the first crop of tabular crystals, wash with alcohol, and dry.'

[5] Preliminary study seems now to indicate that a small amount of dye held in solution

a mutilation of the design is not to be contemplated. This does not make such a severe restriction as may at first appear. Obviously, the minute quantities required for microscopic study can always and easily be supplied from the support, from the ground where it extends beyond the paint film or is exposed in lacunae, and from the surface film where it runs over the edge of the paint film, or where its ultimate location beneath the rabbet of a frame makes the removal of superficial flakes entirely harmless. The sampling of the paint film itself is sure to be more difficult, but it is usually possible to find locations at the edge or bordering lacunae where specimens can be safely removed. If these are so large as to be easily visible to the eye, they are apt to be an extravagance for microscopic study. Sampling is ordinarily done with a fine steel needle or the small steel harpoon commonly used in biological laboratories. The process of removing small samples in the field provided by a binocular microscope or a high-power magnifying lens and of transferring these to a glass slide without applying pressure, or in any other way endangering the painting, can be worked out by any examiner who is familiar with museum technique.

Among the other articles of equipment useful in the routine microscopic examination of specimens from paintings is a set of reference or comparison slides. The extent to which such a set can be built up is, of course, the problem of each examiner. Responses of known film materials to solvents and reagents, if they can be preserved for reference, will be valuable, for the memory of the examiner is seldom sufficiently stocked with their appearance. Slide reference material may include, also, specimens that are preserved for record on a particular painting. This method is little used to date but is one which is capable of almost unlimited growth and value. Small metal carriers for object slides are available in the market, so cut that they will fit into 3 × 5 inch filing cabinets; various types of containers for storing microscope slides are to be had.

when a drop of dilute acetic acid is placed on it, this estimate can be accepted. (This and other reactions of the two materials are shown in Table I.) For negative confirmation, or to try the specimen for calcium sulphate (gypsum) in the event that it has not shown the typical response of a carbonate, a drop of water is put on it and into this is dipped a thin rod that has been moistened with dilute hydrochloric acid. If the specimen contains gypsum, this will recrystallize and, after the drop has stood for a minute or so, until the water has partially evaporated, the edge will contain the characteristic needle-shaped (acicular) crystals of this mineral (see Figure 3). In general, gypsum makes a softer plaster than lime, is more finely crystalline, and rarely contains any large admixture of sand.

Cloth that is used for the support of paintings is almost sure to be either of linen or of cotton fibre. Since the former was far the more prevalent during the Renaissance in Europe, it may be of some value to distinguish between them. The fibres, combed or pulled out at the ends of threads, can be studied by transmitted light if they are put on a microscope slide and teased apart with a needle. They may be sealed in one of the usual mounting mediums for more permanent record. If they are of linen, the fibres will be long, and will show joint-like cross-markings that make them look rather like bamboo; they will also show longitudinal striations; the natural fibre end, though rarely seen, is gradually tapered. Cotton fibres are smoother than linen, are usually twisted, have no nodes or joints, and look like tubes with thickened walls; they are not so long as linen, and the natural end of the fibre is blunt.[6] (Compare the two photomicrographs in Figure 2.)

The fibres that go into the paper used as a support for painting are much the same as those prevalent in cloth supports, but do

[6] See John S. Skinkle, *Elementary Textile Microscopy* (New York: Howes Publishing Co., 1930), pp. 64–68.

include a few others and, because of their relation in paper structure, are somewhat more difficult to identify. Staining tests for paper are now fairly standard and have a considerable variety, both in the solutions used and in the results obtained. According to H. N. Lee,[7] a traditional stain (like the one frequently called 'the Herzberg stain') is made up as follows: '. . . iodine 1 part, potassium iodide 5 parts, water 30 parts, zinc chloride 40 parts. Dissolve the potassium iodide and then the iodine in the water and add the zinc chloride. Allow the mixture to stand, decant the clear liquid and store in a brown bottle.' Before the stain is applied, a few fibres of the paper are separated in water on the microscope slide and are allowed to dry. When the stain solution has been put on the fibres and they are studied at 50× with either daylight or artificial light, the following reactions are observed:[8]

Blue—thoroughly purified wood, straw, grass, and similar fibres.
Brownish red—the cotton-type group, *i.e.*, cotton, linen, ramie, hemp, paper mulberry, and bleached Manilla hemp.
Yellow—woody fibres when not chemically purified from wood itself, straw, or grass. Partly purified woody fibres are less yellow and show greenish, brownish, or even blue or reddish if nearly pure. Papers showing yellow, greenish, or brownish fibres will also show a red or pink with the phloroglucin test.

The grounds and paint films of pictures had best be considered, not according to their positions in the structure of a painting but according to the two principal ingredients that compose them—the medium and the pigment or inert substance. In routine museum examination definite data about the medium can not now be expected. Often the original structure has soaked up film materials put on the surface either by the original designer or during later treatment. Extensive study has been made in an effort to bring the types and combinations of painting mediums within a range where detection is

[7] 'Established Methods for Examination of Paper,' *Technical Studies*, IV (1935), p. 8.
[8] *Ibid.*

include a few others and, because of their relation in paper structure, are somewhat more difficult to identify. Staining tests for paper are now fairly standard and have a considerable variety, both in the solutions used and in the results obtained. According to H. N. Lee,[7] a traditional stain (like the one frequently called 'the Herzberg stain') is made up as follows: '. . . iodine 1 part, potassium iodide 5 parts, water 30 parts, zinc chloride 40 parts. Dissolve the potassium iodide and then the iodine in the water and add the zinc chloride. Allow the mixture to stand, decant the clear liquid and store in a brown bottle.' Before the stain is applied, a few fibres of the paper are separated in water on the microscope slide and are allowed to dry. When the stain solution has been put on the fibres and they are studied at 50× with either daylight or artificial light, the following reactions are observed:[8]

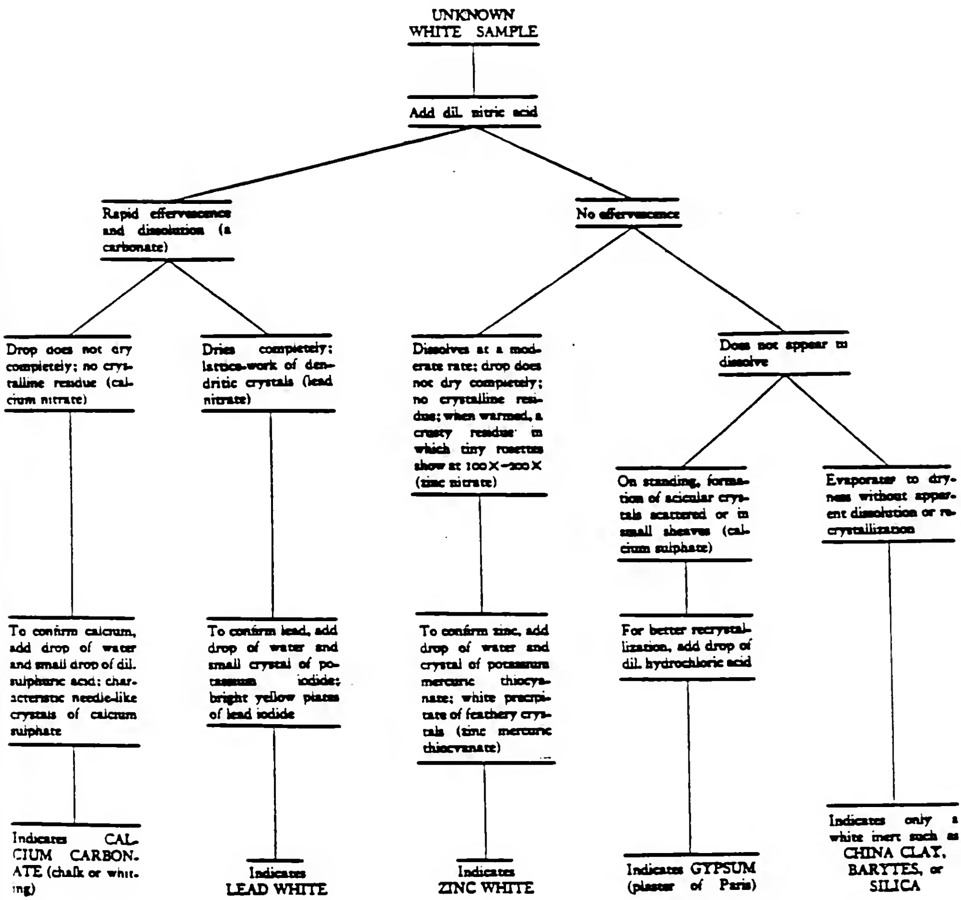
Blue—thoroughly purified wood, straw, grass, and similar fibres.
Brownish red—the cotton-type group, *i.e.*, cotton, linen, ramie, hemp, paper mulberry, and bleached Manilla hemp.
Yellow—woody fibres when not chemically purified from wood itself, straw, or grass. Partly purified woody fibres are less yellow and show greenish, brownish, or even blue or reddish if nearly pure. Papers showing yellow, greenish, or brownish fibres will also show a red or pink with the phloroglucin test.

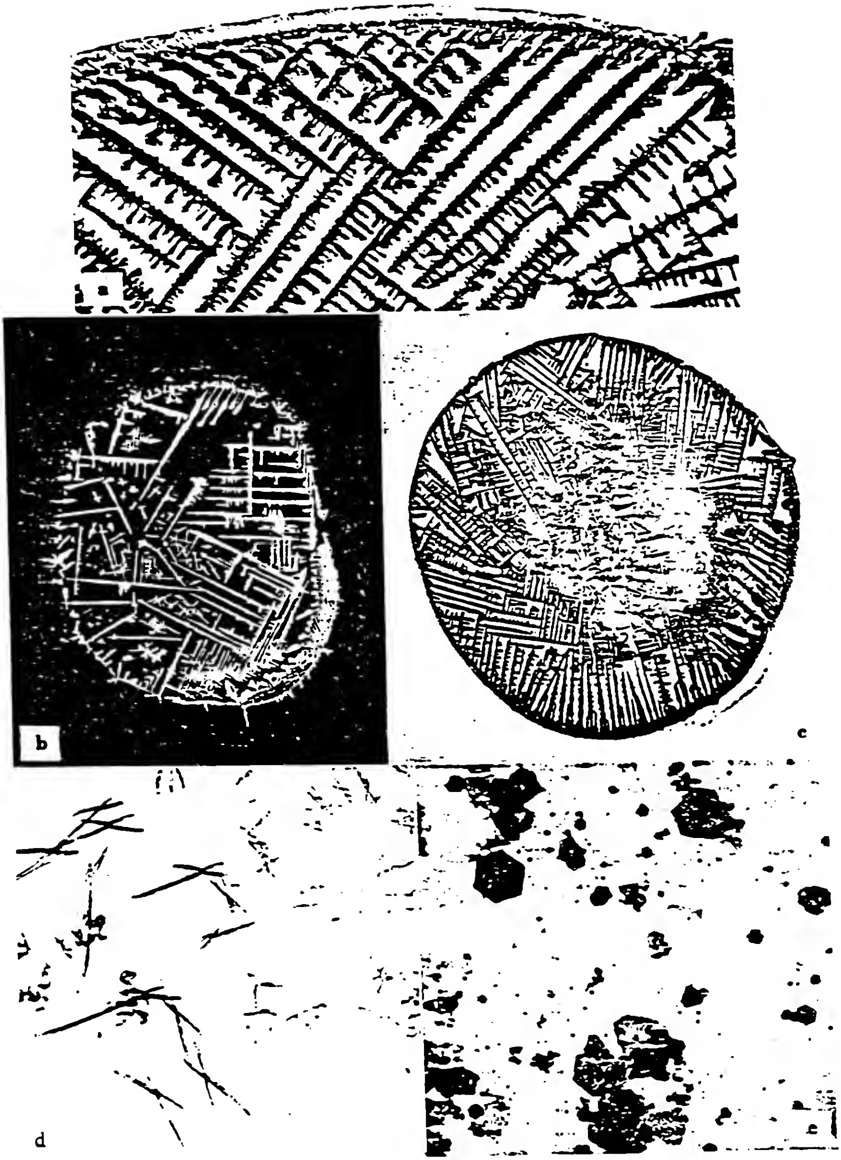
The grounds and paint films of pictures had best be considered, not according to their positions in the structure of a painting but according to the two principal ingredients that compose them—the medium and the pigment or inert substance. In routine museum examination definite data about the medium can not now be expected. Often the original structure has soaked up film materials put on the surface either by the original designer or during later treatment. Extensive study has been made in an effort to bring the types and combinations of painting mediums within a range where detection is

[7] 'Established Methods for Examination of Paper,' *Technical Studies*, IV (1935), p. 8.
[8] *Ibid.*

TABLE I

RECOGNITION OF CERTAIN WHITE PIGMENTS AND INERTS





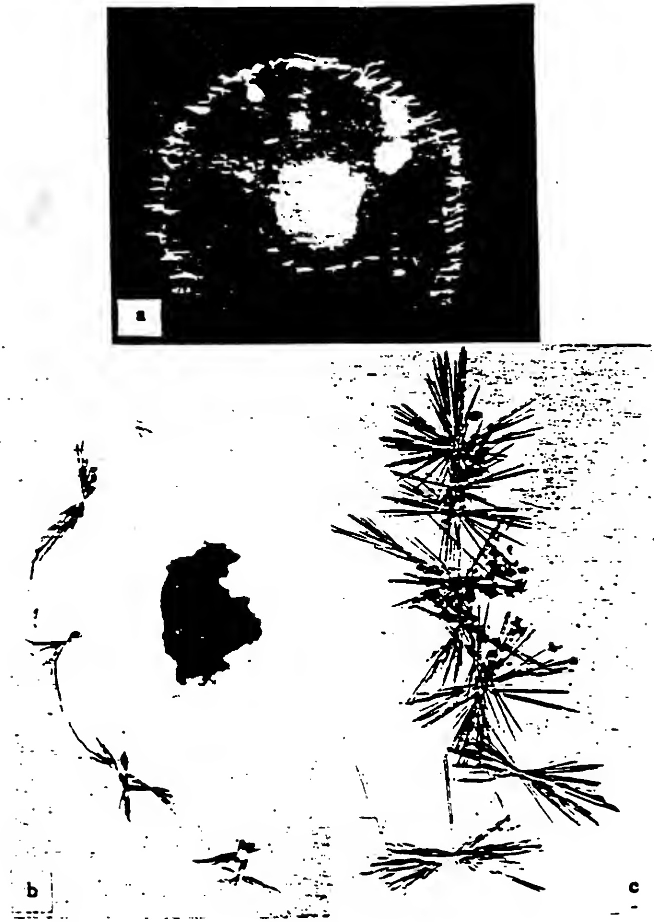
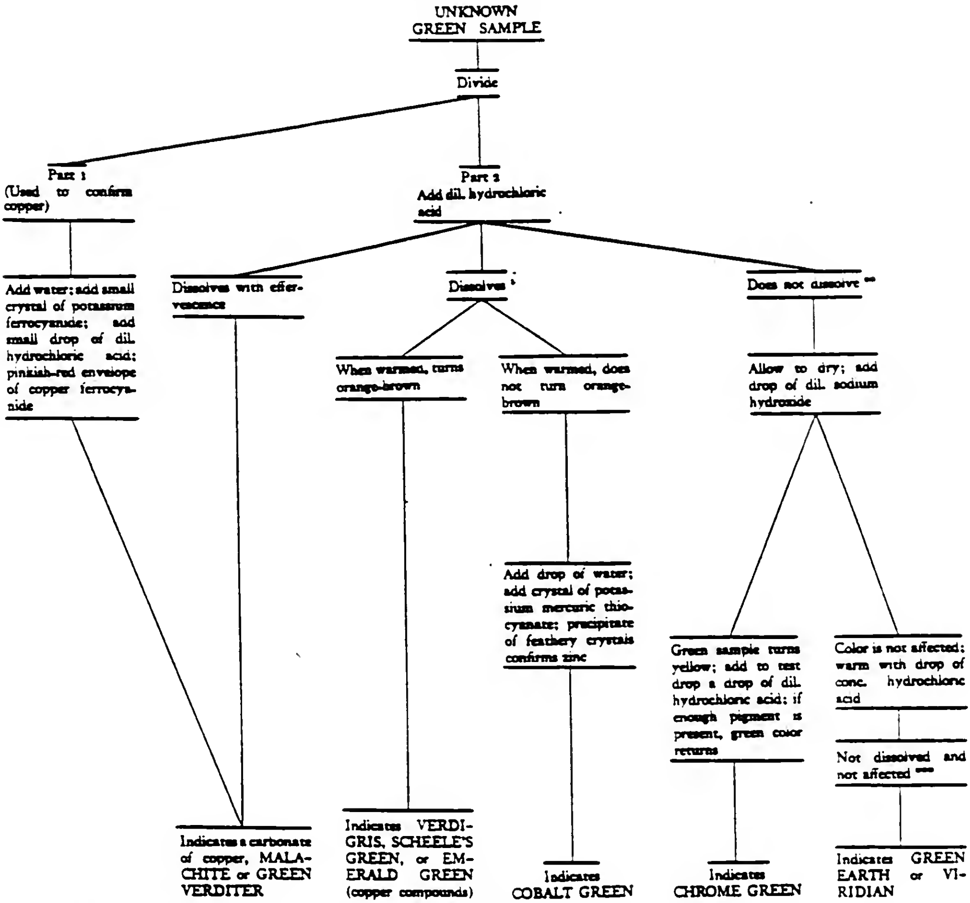


FIGURE 3. Photomicrographs of recrystallized calcium sulphate indicate its appearance under different conditions of illumination and magnification. In *a*, by reflected light and at 35×, a hedge of the crystals may be seen. They have formed at the edge of a drop of dilute hydrochloric acid which was applied to the small specimen of plaster of Paris at the center. In *b* the calcium sulphate has recrystallized from a particle of light gray paint film taken from a Fayum portrait; it is seen by transmitted light at 75×. In *c* are shown, also by transmitted light and at 75×, a group of well-formed sheaves of hydrated calcium sulphate crystals.

FIGURE 5. Crystals of zinc mercuric thiocyanate show highly characteristic forms. In *a*, white, feathery aggregates of these crystals are seen by reflected light at 50×. In *b*, by transmitted light at 100×, crosses with fern-like arms predominate. In *c* with the same illumination and magnification another preparation shows this precipitate in mossy aggregates. Differences in concentrations of the reagents cause these differences in form.

TABLE II

Recognition of Certain Types of Green Pigments



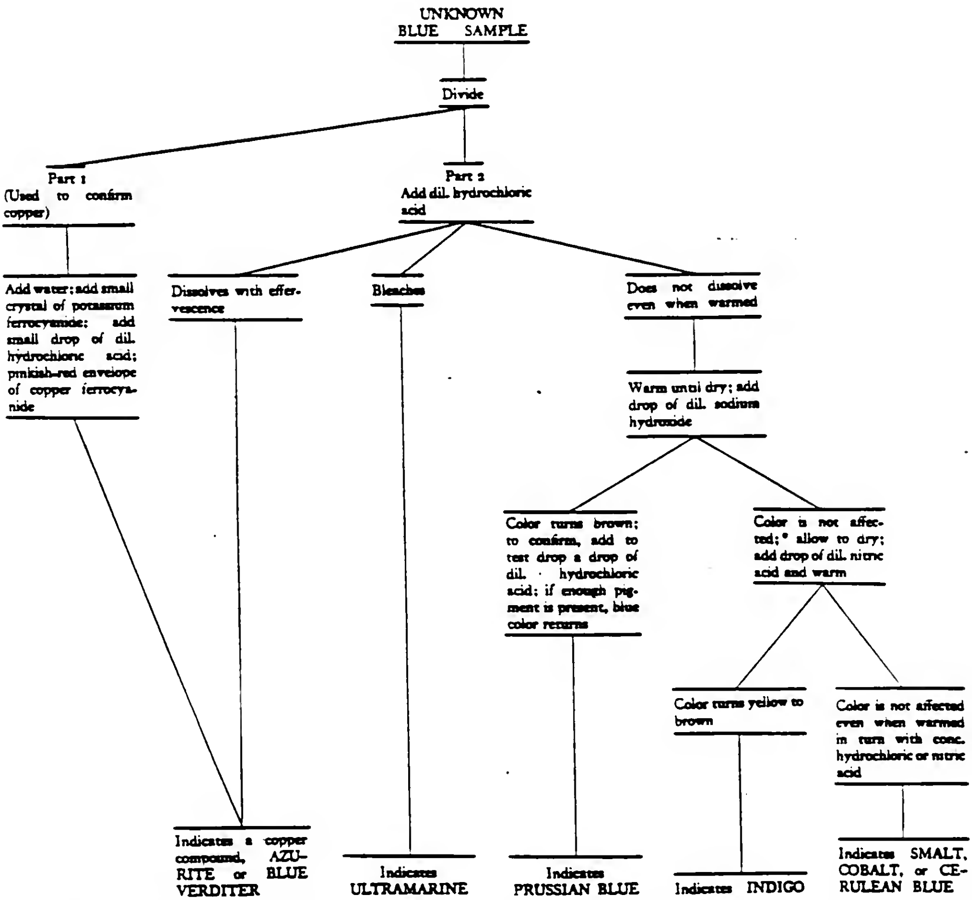
* In cobalt green, if the sample is large, there may be a pale, blue-green residue.

** Change from green to blue color occurs at this point, however, in chrome green and is the first indication of that pigment.

*** Effervescence may occur at this point from the action of the acid on a sodium carbonate impurity in the sodium hydroxide.

TABLE III

RECOGNITION OF CERTAIN TYPES OF BLUE PIGMENTS



* Effervescence may occur at this point from the action of the acid on a sodium carbonate impurity in the sodium hydroxide.

vescence of the copper carbonates.) Natural ultramarine is much coarser and is less homogeneous in particle size than artificial ultramarine.

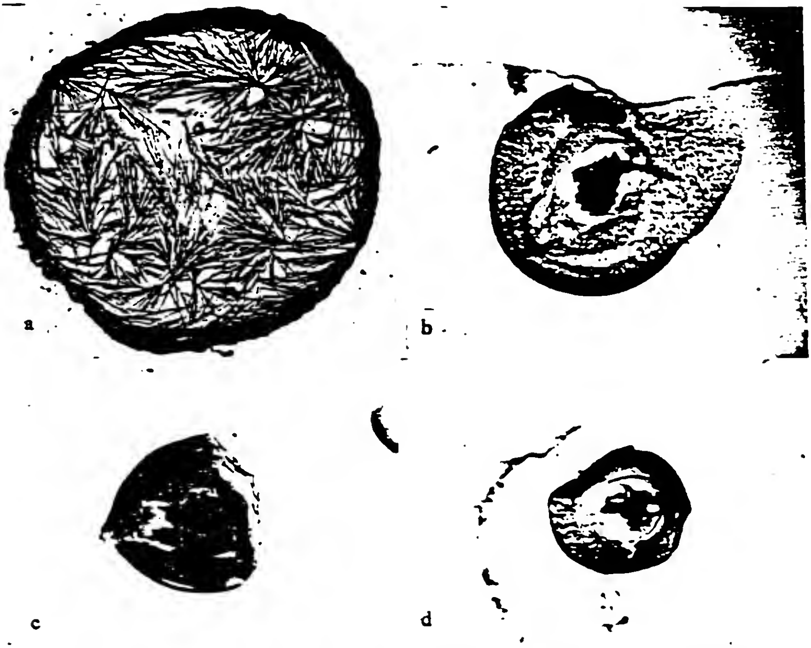


FIGURE 6. When dilute hydrochloric acid is added to most of the copper pigments, a residue of pale green, grass-like crystals of cupric chloride is obtained. When warmed, these crystals turn dark orange-brown, as may be seen in *a*, by transmitted light at 25 ×. In *b*, *c*, and *d* are shown, by the same illumination and magnification, variations of the pinkish-red envelope that surrounds a particle of a copper-bearing pigment when it is treated with acid-ferrocyanide solution. The dark particle in the middle is the treated specimen. In *b* and *d* the edge of the test drop is seen.

If the blue color in the sample being examined is unaffected by dilute hydrochloric acid, it is allowed to dry and is treated with a drop of dilute sodium hydroxide.

ingredients. In routine museum examination, solubility tests are practically the limit to which microscopic study can go. Particles of the surface film can usually be removed with comparative ease and be placed on microscope slides. The changes in such particles made by drops of solvent—xylene, alcohol, or toluene, for example—can be observed and the results noted. If the particles break down either on first or on repeated application of these solvents, it can be assumed that the surface film is largely composed of a soft resin. If dilute sodium hydroxide is required to disintegrate the specimen, the film

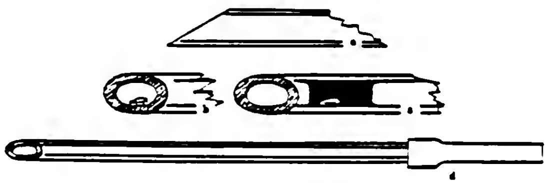


Figure 7. A diagram explains part of the method for capillary immersion of a surface film specimen in a stained solvent. A small dropper with a rubber bulb is used to apply the solvent to the mouth of the tube. The ground, angular shape of the end of the large capillary is shown in profile, twice actual size, in *a*. The position of the sample in the mouth of the tube is indicated in *b* and, in *c*, the way a drop of stained solvent draws up the sample. Below (*d*) is a diagram of the whole tube in actual size. At the end a small piece of rubber tubing helps in delivering the drop.

is probably composed largely of oil or of a hard resin fused in oil. The obvious exception would be a film that had been recently applied and in which solvents would strongly affect the fresh oil; general observations or the record of the painting ought to indicate this condition.

The difficulty with the application of solvent in drop form to specimens of surface film is its rapid evaporation. This can be greatly reduced and the test of solubility made more easily readable by a process of capillary immersion of these specimens in a stained solvent. The stain in this case has no preferential character so far as resins are

concerned, and is used only to produce sharper definition in the field. Malachite green, a dyestuff which is soluble in water and in a few of the organic solvents, has been tried for this purpose. It is taken up to at least 0.01 per cent by ethyl alcohol, acetone, ethylene dichloride, diacetone alcohol, and probably by other solvents particularly of the alcohol and ketone groups. Particles of the resin, approximately a half millimetre square, are put in the end of a large capillary (having an inside diameter of about 1 mm.) which is ground down to a shape like that of a hypodermic needle (Figure 7). At the other end is a short piece of rubber tubing. A drop of the stained solvent is placed on the resin particle which is taken up by it and is carried a short way into the tube by capillary movement. It can stay there for some minutes without losing enough solvent to prevent its easy delivery on a slide. The drop is delivered by pressing the rubber tube and a second drop of pure stained solvent is put on the same slide. After both this and the specimen are thoroughly dry, the slide is washed with water until the stain that was carried by the solvent alone has disappeared. This leaves a small drop of sharply-defined, stained, dissolved or undissolved resin, and comments about solubility can be made from this more exactly than from exposure of the solvent on the slide alone (Figure 8). If there is pigment in the surface film introduced for the purpose of darkening the tonality of the painting, particles of that will be left in the drop and will be held in place by the surrounding resin.

FOGG ART MUSEUM, HARVARD UNIVERSITY

FIGURE 8. Examples of drops of stained solvent after varnish specimens had been left in them for 20 minutes each. Immersed specimens were kept in a capillary for that time and after the drops were delivered on a slide and were dry, they were washed with water to remove excess stain. Complete solution occurred with mastic in acetone (*a*), copal in acetone (*c*), mastic in ethylene dichloride (*d*), and dammar in ethylene dichloride (*e*). Particles of undissolved resin are left in the specimens of dammar in acetone (*b*) and of a proprietary amber varnish in ethylene dichloride (*f*). Dark particles in the other fields are lint caught from the air when the specimen was drying. (Magnification in all cases is 9×.)

Pigments Tested for During Paint Analysis

Common Name	Chemical Name	Chemical Formula
	White Pigments	
Lead White	Basic Lead Carbonate	PbOH
Whiting	Calcium Carbonate	CaCO
Zinc White	Zinc Oxide	ZnO
Gypsum	Calcium Sulfate Dihydrate	$CaSO_4 \cdot 2H_2O$
Titanium White	Titanium Dioxide	TiO
	Green Pigments	
Verdigris	Dibasic Copper Acetate: Two Parts Cupric Acitate One Part Cupric Hydroxide Five parts Water	$2Cu(CH_3COO)_2 : Cu(OH)_2 : 5H_2O$
Scheele's Green	Copper Hydro-arsenate	$CuHAsO_3$
Emerald Green	Copper Aceto-arsenate	$Cu(C_2H_2O_2)\ 3Cu(AsO_2)_2$
Chromium Oxide Green	Anhydrous Chromic Oxide	Cr_2O_3
Viridian or Guignets Green	Chromic Hydroxide	$Cr(OH)_3\ nH_2O$
Chrom Green	Mixture of Prussian Blue and Chrome Yellow	$Fe_4[Fe(CN)_6]_3 + PbCrO$
	Blue Pigments	
Prussian Blue Berlin Blue Chinese Blue Paris Blue Hamburg Blue Mineral Blue	Ferric Ferocyanide	$Fe_4[Fe(CN)_6]_3$
Azurite	Basic Copper Caorbonate	$2CuCO_3-Cu(OH)_2$
Ultramarine (Lapis Lazuli)	Sodium Aluminum Silcate and Sulfur	$Na_7Al_6Si_6O_{24}S_2$
Colbalt Blue	Cobalt Aluminate	$CoO \cdot Al_2O_3$
	Red Pigments	

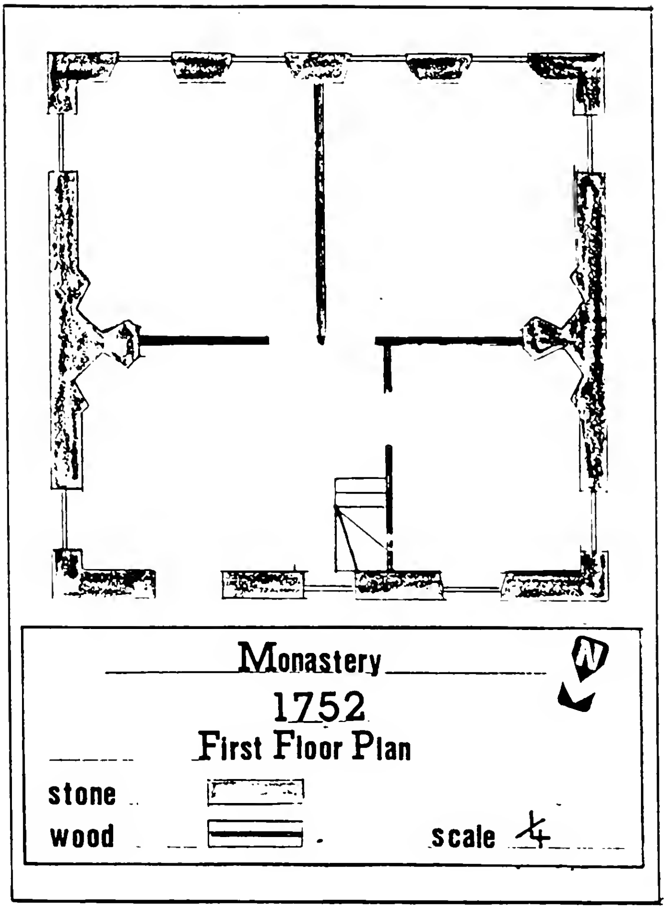
Vermilion Chinese Red Cinnabar	Red Mercuric Sulfide	HgS
Iron Oxide	Ferric Oxide	Fe_2O_3
Red Lead	Lead Tetroxide	Pb_3O_4
Madder	Extract from the root of the madder plant on Aluminum Hvdroxide Base.	Alizarin $C_{14}H_8O_4$ Purpurin
Alizarin	" "	$C_{14}H_8O_4$

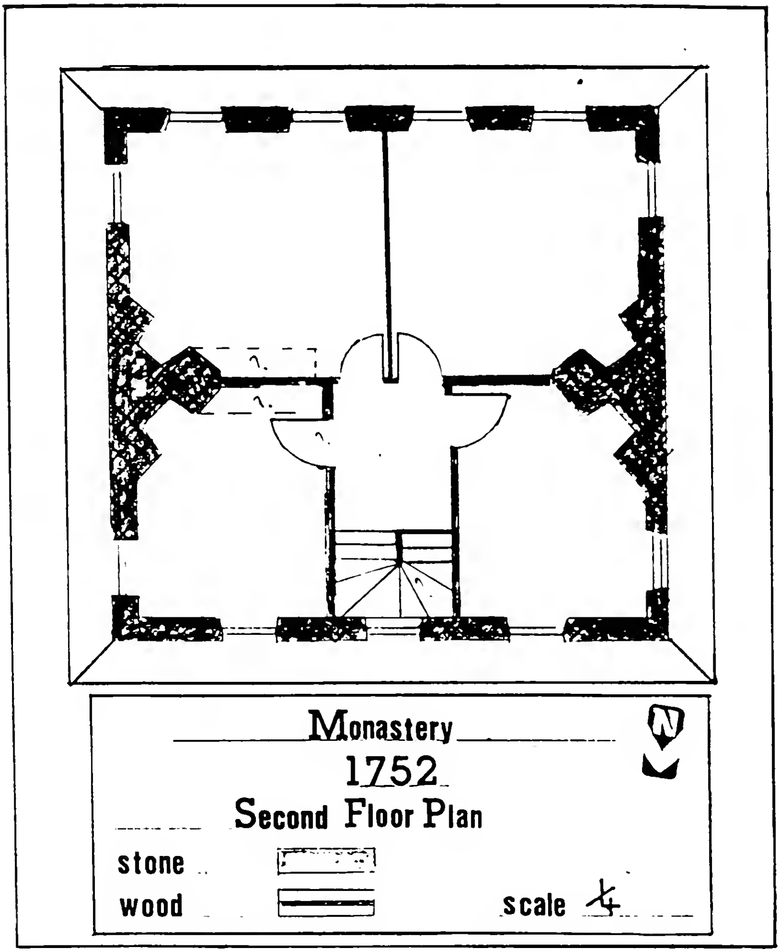
Yellow Pigments

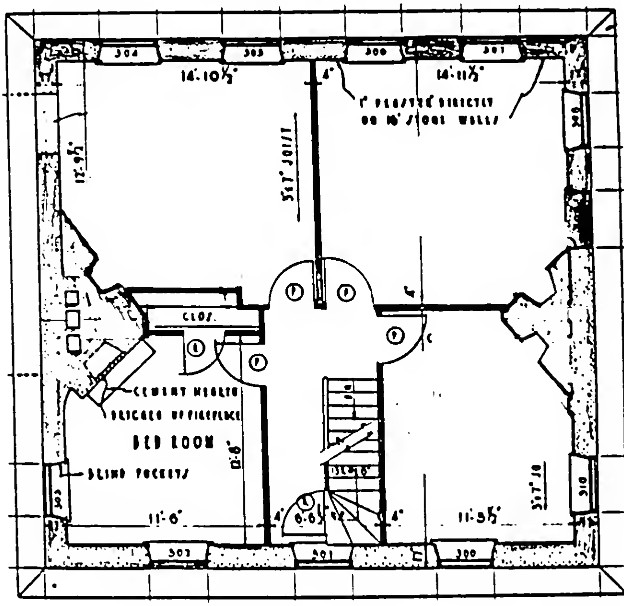
Litharge	Lead Monoxide	PbO
Yellow Ochre	Hydrated Ferric Oxide	$FeO(OH)\cdot nH_2O$
Naples Yellow	Lead Antimonate	$Pb_3(SbO_4)_2$
Barium Yellow	Barium Chromate (IV)	$BrCrO_4$
Strontium Yellow	Strontium Chromate (IV)	$SrCrO_4$
Cobalt Yellow	Cobaltic Potassium Nirite	$CoK_3N_6O_{12}$
Cadmium Yellow	Cadmium Sulfide	CdS

Appendix #4
Monastery
1760 Floor Plans

These floor planes are based on the Historical American Building Survey architectural drawings done in 1935 and a visual inspection of the structure. The basement and the fourth floor are omitted.


Monastery
1752
First Floor Plan
stone
wood
scale 1/4


Monastery
1752
Second Floor Plan
stone
wood
scale 1/4
N



Monastery

1752

Third Floor Plan

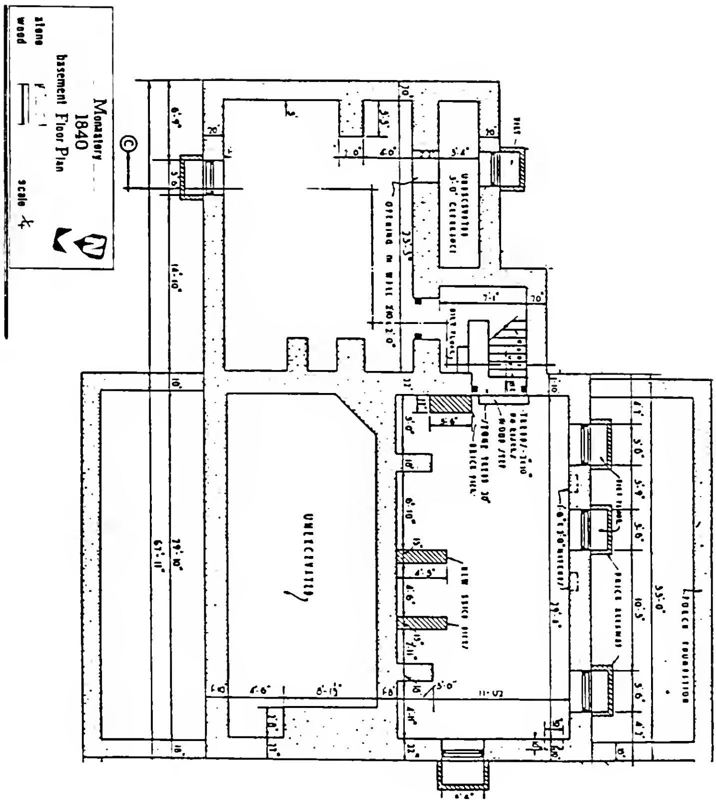
stone

wood

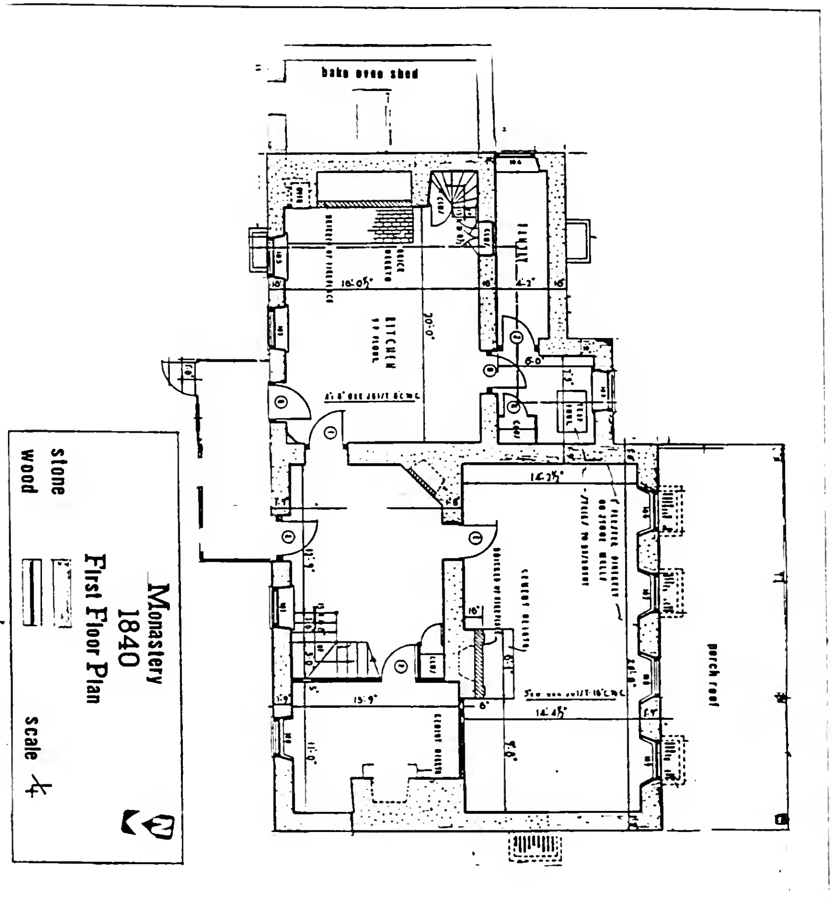
scale 1/4

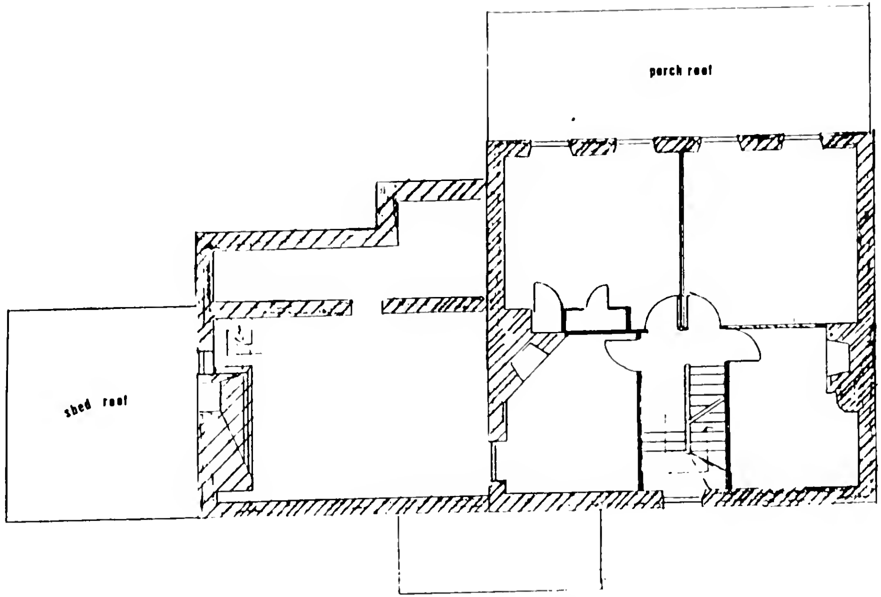
Appendix #5
Monastery
1840 Floor Plans

These floor plans are based on the Historical American Building Survey drawings done in 1935 and visual inspection of the building.



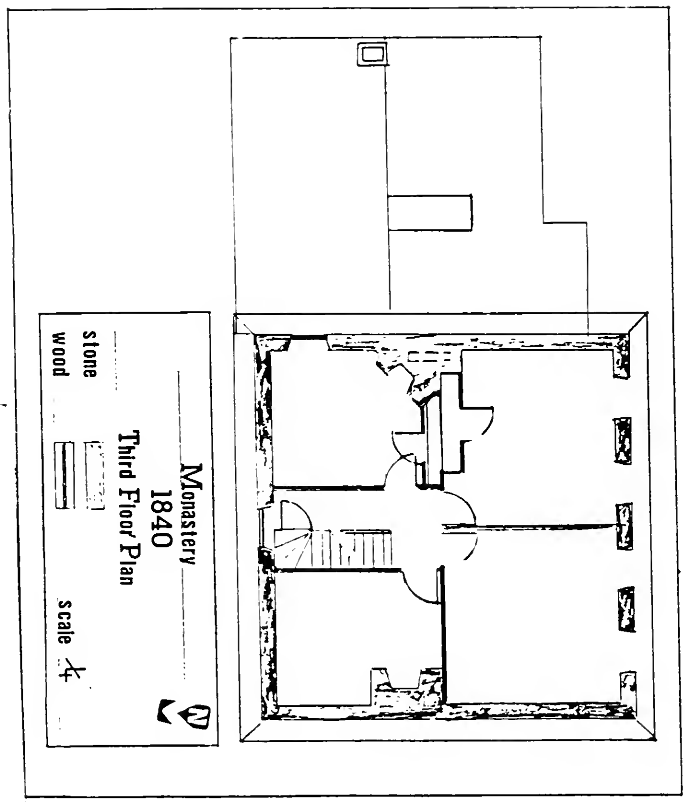
Monastery
1840
basement Floor Plan
stone
wood
scale
UNEXCAVATED
OPENING IN WALL

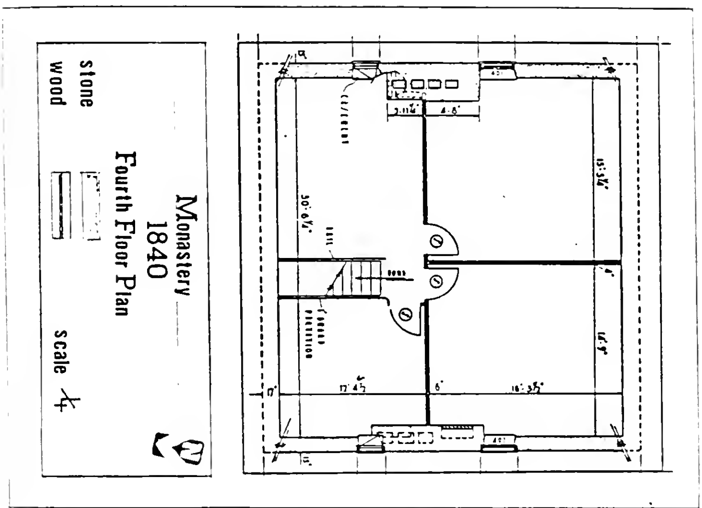

bake oven shed
porch roof
Monastery
1840
First Floor Plan
stone
wood
scale



Monastery
1840
Second Floor Plan

stone
wood
scale ¼


Monastery
1840
Third Floor Plan
stone
wood
scale


Monastery
1840
Fourth Floor Plan
stone
wood
scale

Appendix #6

Chain of Title for the Monastery
Form the Title Regestry of the Department of Records,
Philadelphia City Hall, Philadelphia Pa.

Chain of Title for the Monastery Mansion

Philip Lehuman: Sept. 2, 1685. Letter of patent to Philip Lehuman for 200 acres of land in Roxborough Township. Patent Book A-Foil. 106, cited in Deed book H-2-214.

John Jennet	Deed Book, E-5-199 cited in Deed Book, H-2-214	Jan. 9, 1685/6
Henry Frey	Deed Book, B-2-360 cited in Deed Book. H-2-214	Oct. 1. 1692.

Henry Frey splits the lot into two pieces and sells twenty acres to George Jacob on Feb. 3, 1724, which, on March 2, 1729/30 is in turn sold to Jacob Rinker. Both transactions are cited in Deed Book H-2-21. Two and a half acres of the twenty acres is sold to Benjamin Shoemaker on Nov. 3, 1742.
A 100 acre portion of the original lot is sold to John George Wood on March 9, 1729.

John George Wood	Deed Book, H-2-214 100 acres for 87 pounds.	March 9. 1729

From 1742 to 1746 Benjamin Shoemaker buys up the two tracts of land mentioned above and two others.

The lots are:

To Benjamin Shoemaker	Nov. 3, 1742 Deed book, H-12-321 2 acres and 149 1/2 perches	From Jacob Rinker

To Benjamin Shoemaker Oct. 29, 1742 From John Gomrey
cited in Deed Book H-12-306 along with the complete chain for this property, which contained a messuage plantaion and two tracts of land, one of thirty-seven 1/2 acres and the other of eighty-five acres. The deeds for this transaction can be found in the Germantown Historical Society. See Appendix #1

To Benjamin Shoemaker	March 21, 1745/6 Deed Book,H-12-299 3 acres 73 perches	From John George Wood

In 1746/7 Benjamin Shoemaker sells all four lots to John Gorgas.

John Gorgas	Deed Book, H-12-306 3 acres and 72 perches 2 acres and 149 1/2 perches 85 acres 37 1/2 acres	March 2, 1746/7

Described in the Deed as two tracts of land and a Messuage Plantation
Paid 300 Pounds

John Gorgas sells partial interest in these tracts of land to several people.

To Jacob Simon Michael Pelsner	Deed Book, H-12-314 Sold 1/2 interest three tracts of land: 3 acres and 72 perches 2 acres and 149 perches 27 acres part of the 85 acres.	Nov. 27, 1747

To Adam Yager	Nov. 16, 1751 Deed book, E.F.-15-182	From Jacob Simon

Convey 1/4 interest in the land which was originally sold to Simon by John Gorgas.

In 1752 Joseph Gorgas begins to buy up all the interest to the property which his brother John originally owned. The deeds describe th improvements made on the land as: A saw mill, grist mill, and several other messuages and buildings.

To Joseph Gorgas	April 6, 1752 Deed Book, H-2-356	From John Gorgas

Conveys the moiety of two acres of land part of the twenty-seven acres. On this land Joseph Gorgas is credited with the building of the house. "... Where upon the above named Joseph Gorgas has since at his own cost and charge built and erected a stone three story house of messuage on a certain piece or spot of ground part of the aforesaid 27 acres."

To Joseph Gorgas
Skin Dresser

April 10, 1752
Deed Book H-2-359
Paid Five Pounds

From Adam Yager

Sold 1/4 interest in a stone messuage and two-acre lot part of the 27 acre lot.

To Joseph Gorgas
Miller late Skin Dresser

April 15, 1752
Deed Book, H-2-362
Paid 25 Pounds

From Mary Pelsner
Widow of
Michelle Pelsner

Description of the tracts of land includes this description of the improvements that "Jacob Simon, John Gorgas and Michael Pelsner who in possession of the other moiety did build and erect a Grist Mill, Saw Mill and several other messuages and buildings." Mary Pelsner sells her 1/4 interest in the land and improvements to Joseph Gorgas.

The remaining 1/4 interest in the three tracts of land which was bought from John Gorgas by Adam Yager is never conveyed to Joseph Gorgas. It is reunited with the whole when Peter Care buys the property.

To Joseph Gorgas

Deed Book. H-12-302

Dec. 21, 1759

Interest in three tracts of land and whole interest in nine acres, which was part of the twenty-seven acre tract. The mills are mentioned in this deed but a messuage is not.

Paid 600 pounds.

To Edward Milner
of Roxborough
Miller

June 8, 1761
Deed Book, I-3-317
Paid 1500 dollars.

From Joseph Gorgas

Conveyed to Edward Milner interest in three tracts of land. Two acres 149 perches, 3 acres 72 perches and 27 acres. See Appendix #2. "On the first tract of land there is a certain Messuage or tenement erected and on the second and third a grist mill, or a corn mill and a saw mill." The improvements are further described as: "on the first described tract of land with the messuage or tenement and other buildings and improvements there on erected by the said Joseph Gorgas by force and virtue of some good conveyance or assurance in the law duly had and executed."

To Peter Care

March 17, 1775
Deed Book, I-14-279

From Edward Milner

To Peter Care — June 11, 1776 — From Paul Engle
Deed Book, I-16-20

This indenture conveys 1/4 interest in the three tracts of land originally bought by John Gorgas and sold to Yager. This interest in the land is then sold in a sherrif's sale to Leonard Stonebumer. Stonebumer sells the interest to Paul Engle in 1758. Deed book I-14-456.

To John Miller Jr.
Thomas W. Francis.
For benefit of creditors.
April 21 1802 — From Peter Care
Deed Book, Ef-9-170

Peter Care became bankrupt and gave the property to Miller and Francis to sell to pay his creditors.

To John Livezy
Miller
Feb. 18 1803 — From John Miller Jr.
Thomas Francis
Deed Book, EF-13-569
paid $14,250.

To Joseph Livezy
and wife
Feb. 7, 1805 — From John Livezy
Deed Book, EF-22-463

1/2 interest in five tracts of land, the stone messuage and the mills.
Paid $17,195.

Description of property: Stone messuage and merchant mill, and five pieces of land. Bolting mill, 3 pr. of Burr mill stones, elevators, screening fan and weights, scales and wheels.

To John Conrad
City of Philadelphia
Book seller
Aug. 27 1808
Deed Book, EF-30-469
Paid $19,500
John Livezy
Joseph Livezy
Millers from Roxborough

To Gavin Hamilton. — April 28, 1815
Deed Poll, Supreme Court. Recorded in Book C page 481.
John and Joseph Livezy vs. John Conrad deeded to Gavin Hamilton. Paid $5,900. Gavin Hamilton bought the property with funds from Robert and Samuel Paterson Campbell, who each own 1/2 interest in the property.

To Samuel Campbell et all.
New York Broker
April 23 1816 — From Samuel Paterson Campbell,
Deed Book, MR-14-10

John Chambers, Book seller   Convey 1/2 interest   gentleman
George Davis   Paid $1.00.

Description of land: Paper mill, messuage and tracts of land.

To John Lonstroth   July 13, 1818   From Samual Campbell,
Merchant   Deed Book, MR-17-40   et al.

Description of land: eighty-three acres containing five tracts of land and a messuage, paper mill and tenement.

To The Pennsylvania Company for Insurance on lives and Granting Annuities Assingnees. Deed Poll, District Court, Recorded in Book F page 166.   June 16, 1832.
The Pennsylvania Company. Vs. John Longstroth, Deed to the Pennsylvania Company. Paid $7,000 for five tracts of land containing 83 acres on which a messuage and paper mill stood.

To Joshua Garsed et al.   Aug. 10, 1832   From The Penn.
of Frankford   Deed Book, AM-29-681   Company.
John Raines   Paid 10,000
Joshua Garsed Jr.   83 acre lot.
William Willock
Under firm of Garsed, Rains and Co. Manufactures.

To John Brock and   Sept. 11, 1841
James Hart

Deed Poll, District Court, recorded in Book K page 344. The Pennsylvania Company for Insurances in lives and Granting Annuities Vs. Joshua Garsed Jr. and William Willock deeded to John Brock and James Hart. Eighty-three acres with tenement and paper mill.

To Elisabeth Weest   April 15, 1843   From John Brock
Deed Book, RLL-7-34   et al.

To William Kitchen   Nov. 24, 1853   From Francis Weest
William Gordon Kitchen   Deed Book, TH-52-264   Nephew of
Paid $10,500   Elizabeth.

Elizabeth died in testate, property was given to her nephew.

To William Gordon Kitchen   Sept. 15 1864   From William Kitchen
Deed Book, LRB-51-173
Convey 1/2 interest

In 1871 William Gordon Kitchen died in testate and property was given to his wife, Susan Kitchen, and their seven children. In this same year the City of Philadelphia determined that it needed this land for Fairmount Park. In 1873 the City of Philadelphia paid Susan Kitchen and her seven children $53,500 for the property which ran along the Wissahickon Creek.

To The City of Philadelphia   March 31, 1873   From Susan Kitchen
Deed Book FTW-41-283   et al.

To The City of Philadelphia   June 30 1898   From Susan Kitchen
Deed Book WMG-327-215

The Monastery Mansion was built between 1747 and 1752. It is clear from the deeds that Joseph Gorgas built the house.

Sources:

Title Registry of the Department of Records, Philadelphia City Hall.

"Brief of Title to a Tract of land, part of which is included in the bounds of Fairmount Park, the property of The Estate of Willian Gordon Kitchan." Fairmount Park Commission, Box #8, William Gordon Kitchen, City Hall Archives, City Hall Annex, Philadelphia.

Fairmount Park Commission, Box #8-A, Susan Kitchen, City Hall Archives, City Hall Annex, Philadelphia.

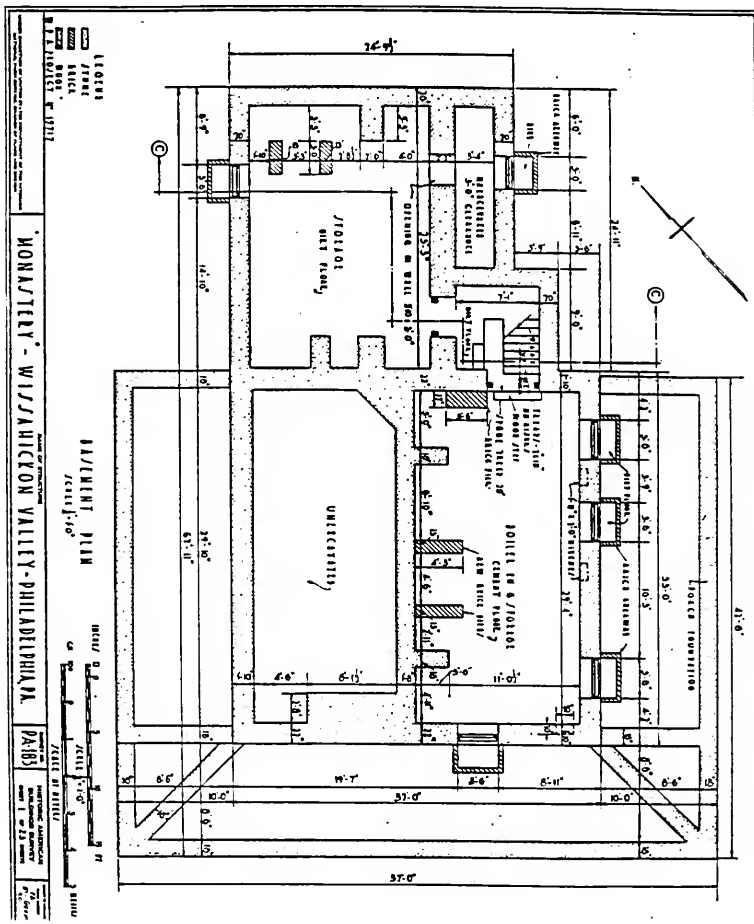
Appendix #7

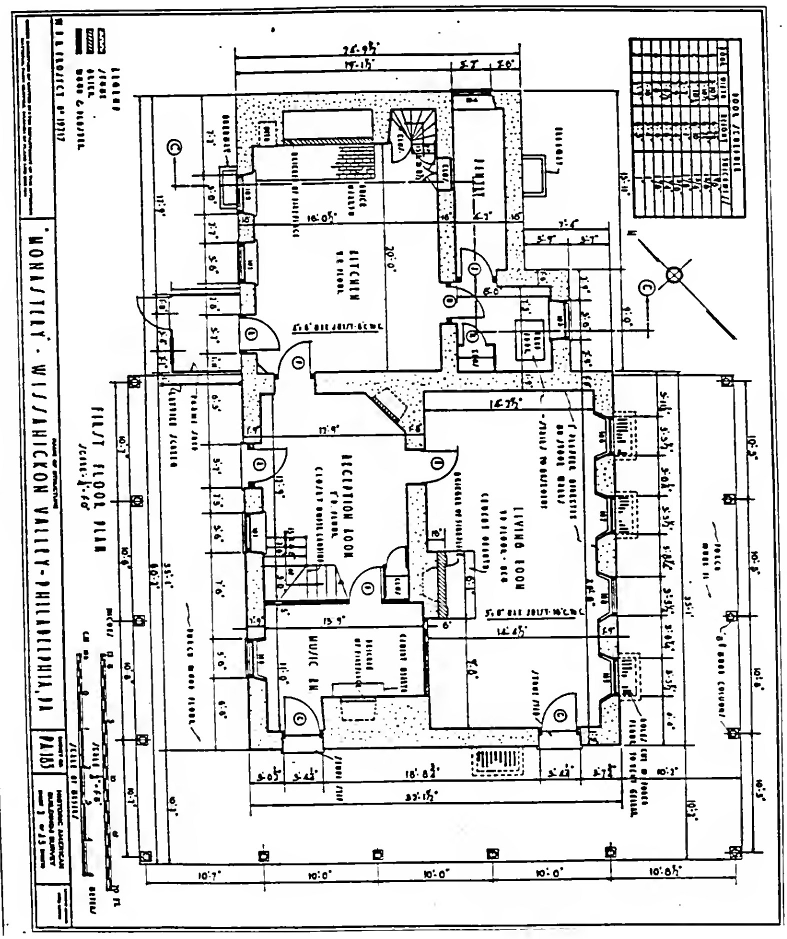
Monastery

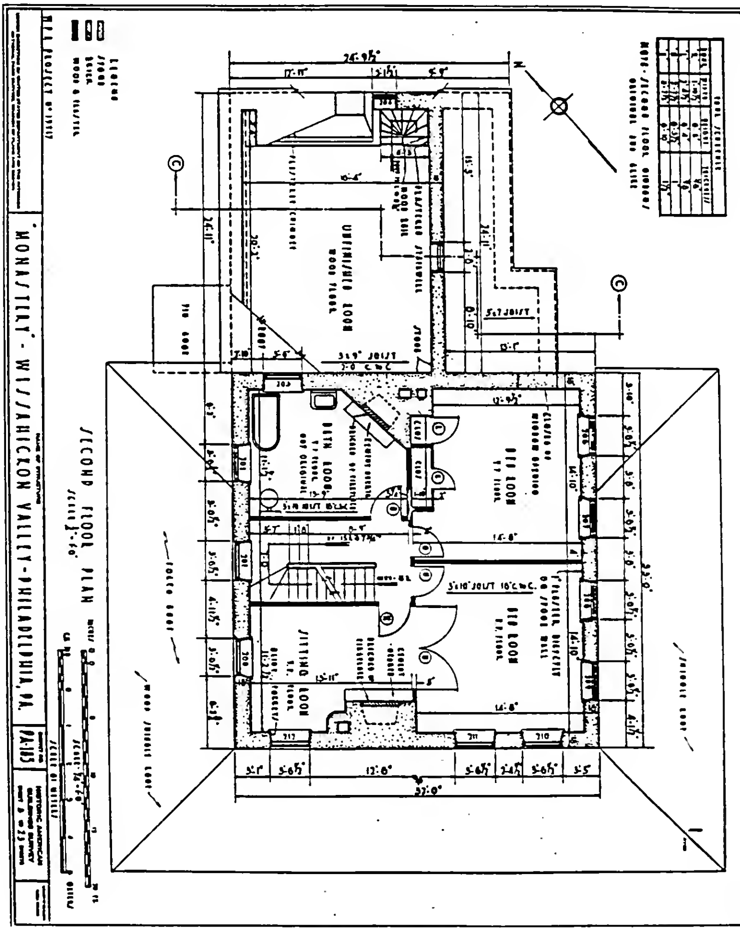
1935 Floor Plans and 1986 Floor Plans

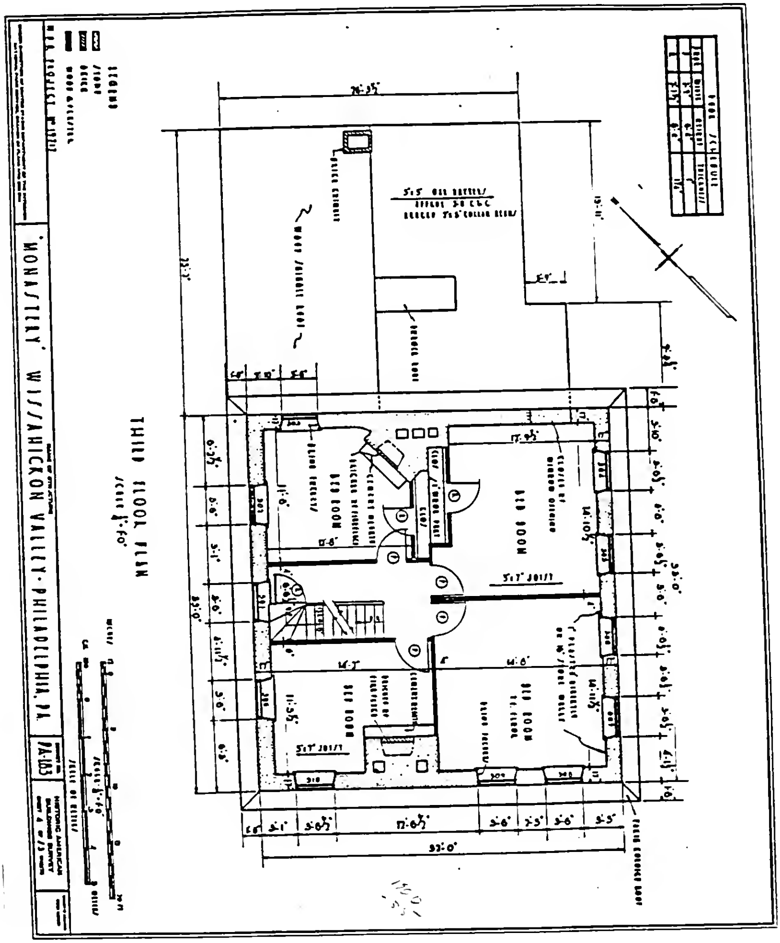
1935 Historic American Building Survey Drawings

The 1986 Floor Plans are based on the Historic American Building Survey drawings and the presents configuration of the building.

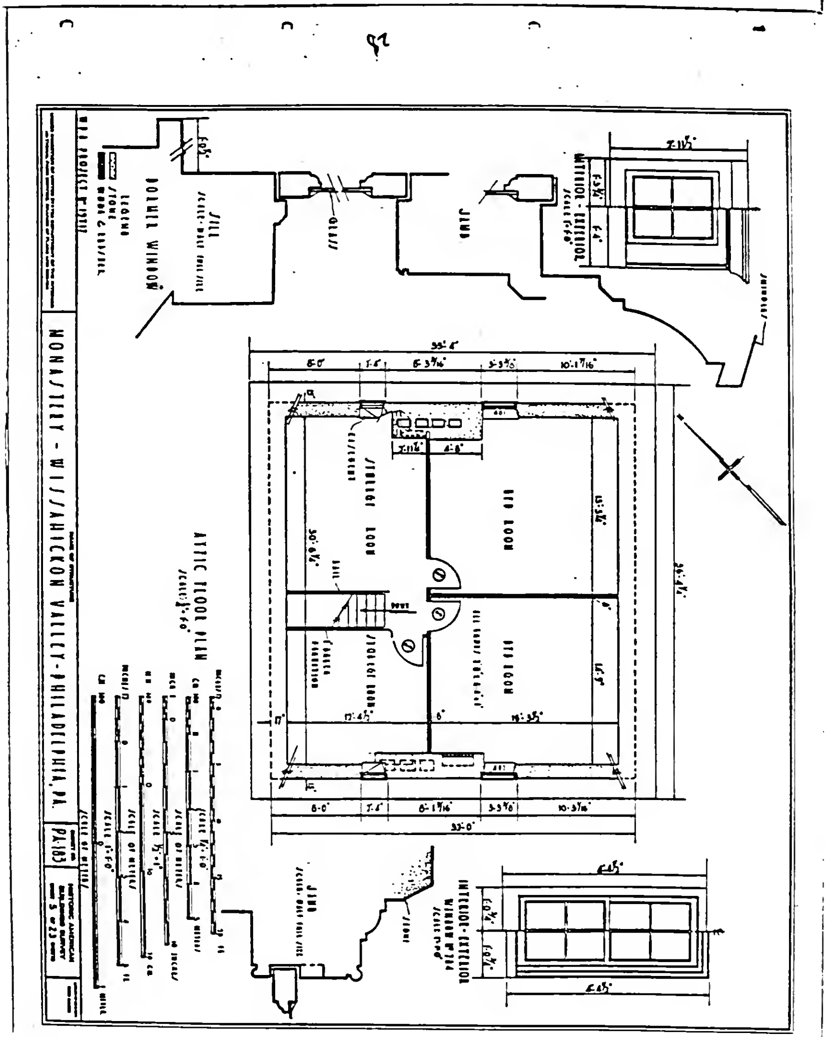

BASEMENT PLAN
STORAGE DIRT FLOOR
UNEXCAVATED
BOILER RM & STORAGE CEMENT FLOOR
LEGEND
STONE
BRICK
WOOD
"MONASTERY" - WISSAHICKON VALLEY-PHILADELPHIA, PA.
PA-183
HISTORIC AMERICAN BUILDINGS SURVEY

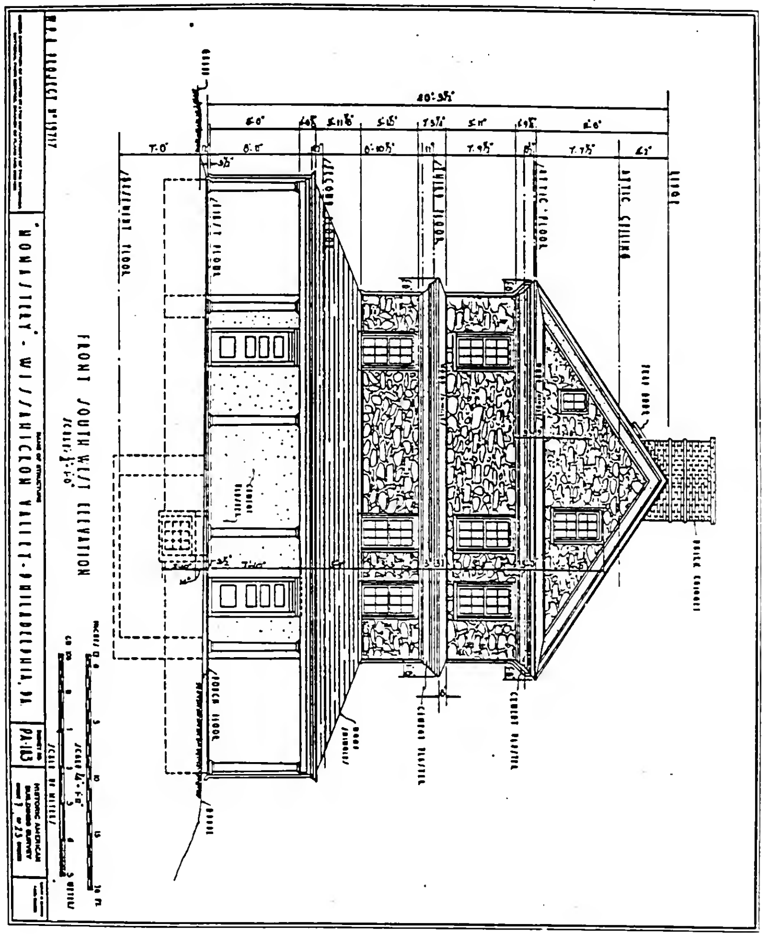

MONASTERY - WISSAHICKON VALLEY - PHILADELPHIA, PA
FIRST FLOOR PLAN
KITCHEN
PANTRY
RECEPTION ROOM
LIVING ROOM
MUSIC RM


MONASTERY - WISSAHICKON VALLEY - PHILADELPHIA, PA.
SECOND FLOOR PLAN

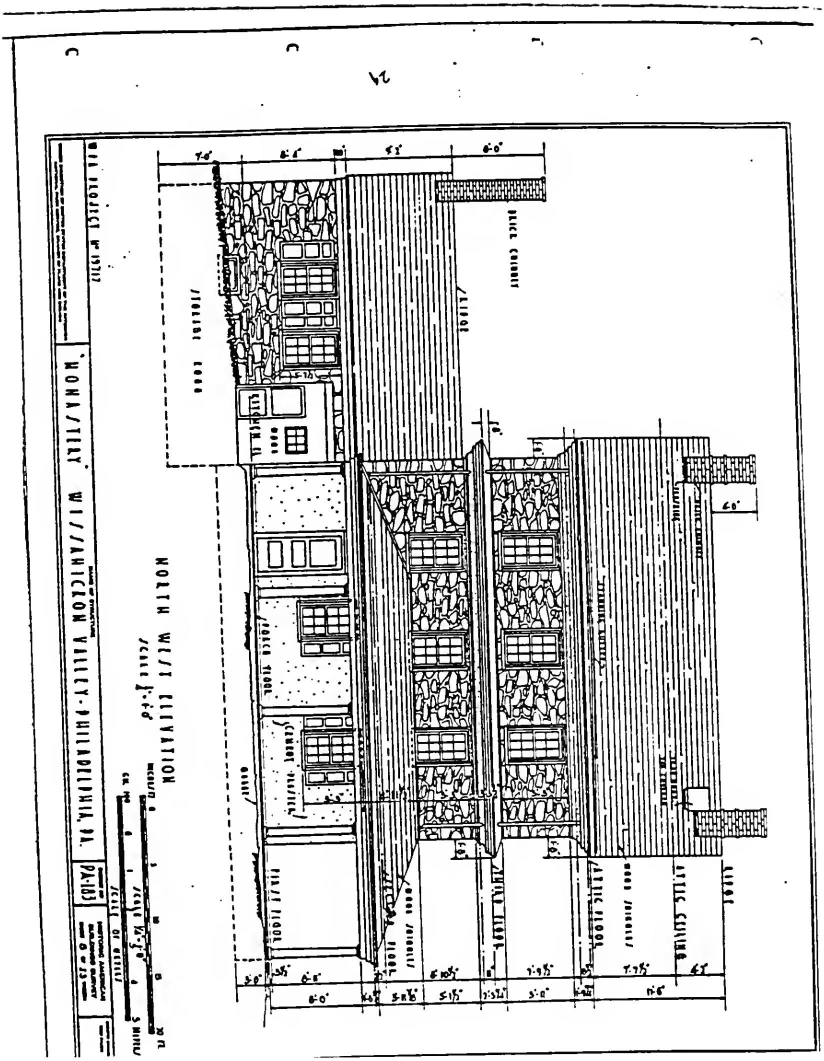


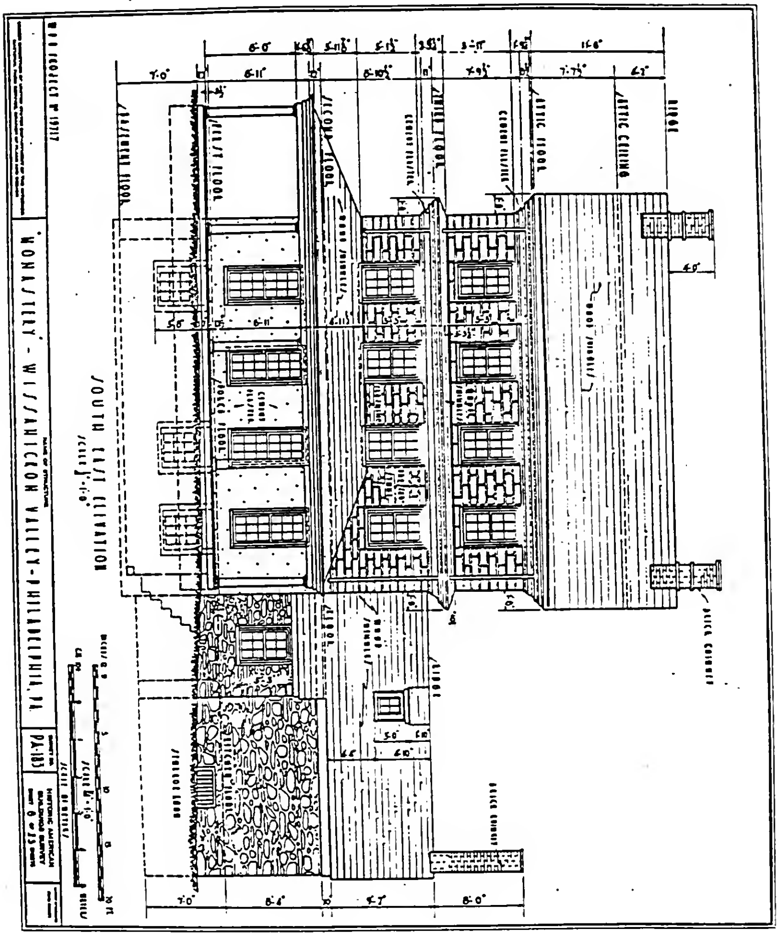
THIRD FLOOR PLAN
BED ROOM
BED ROOM
BED ROOM
BED ROOM
33'-0"
25'-3"
'MONASTERY' WISSAHICKON VALLEY-PHILADELPHIA, PA.
PA-183
HISTORIC AMERICAN BUILDINGS SURVEY


MONASTERY - WISSAHICKON VALLEY - PHILADELPHIA, PA.
ATTIC FLOOR PLAN
DORMER WINDOW
SILL
JAMB
GLASS
PA-183

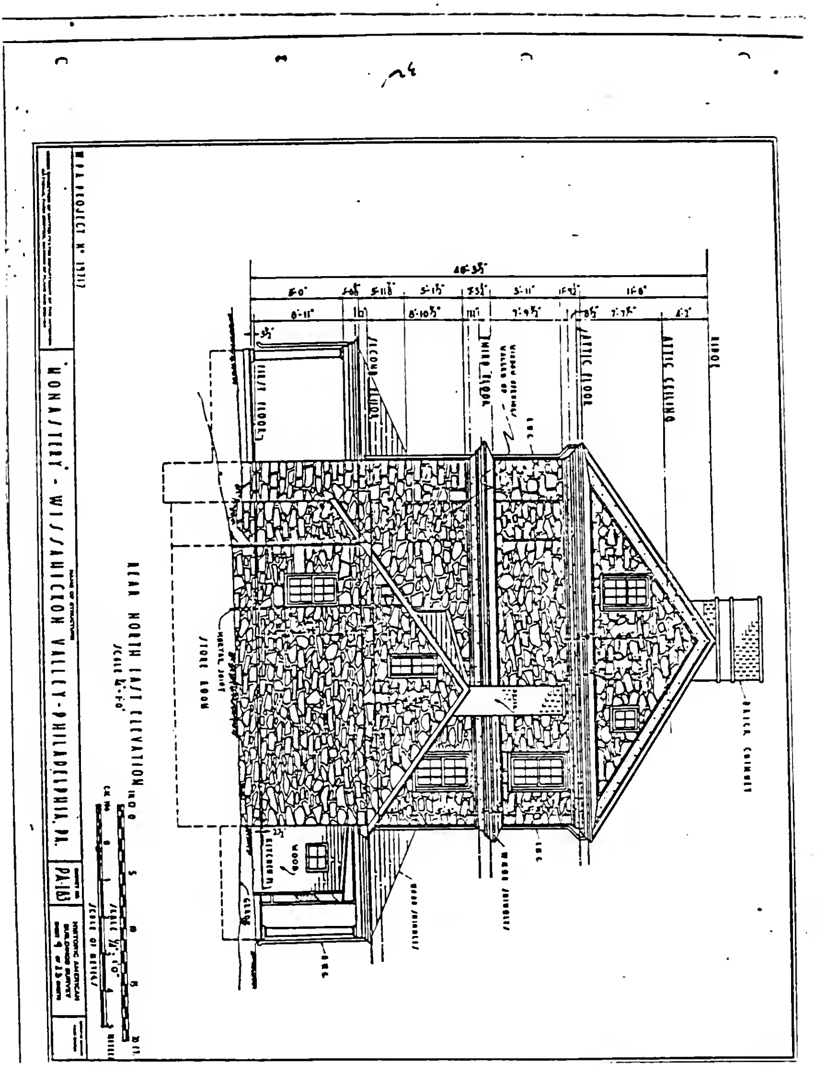


FRONT SOUTH WEST ELEVATION
MONASTERY - WISSAHICKON VALLEY - PHILADELPHIA, PA.
HISTORIC AMERICAN BUILDINGS SURVEY

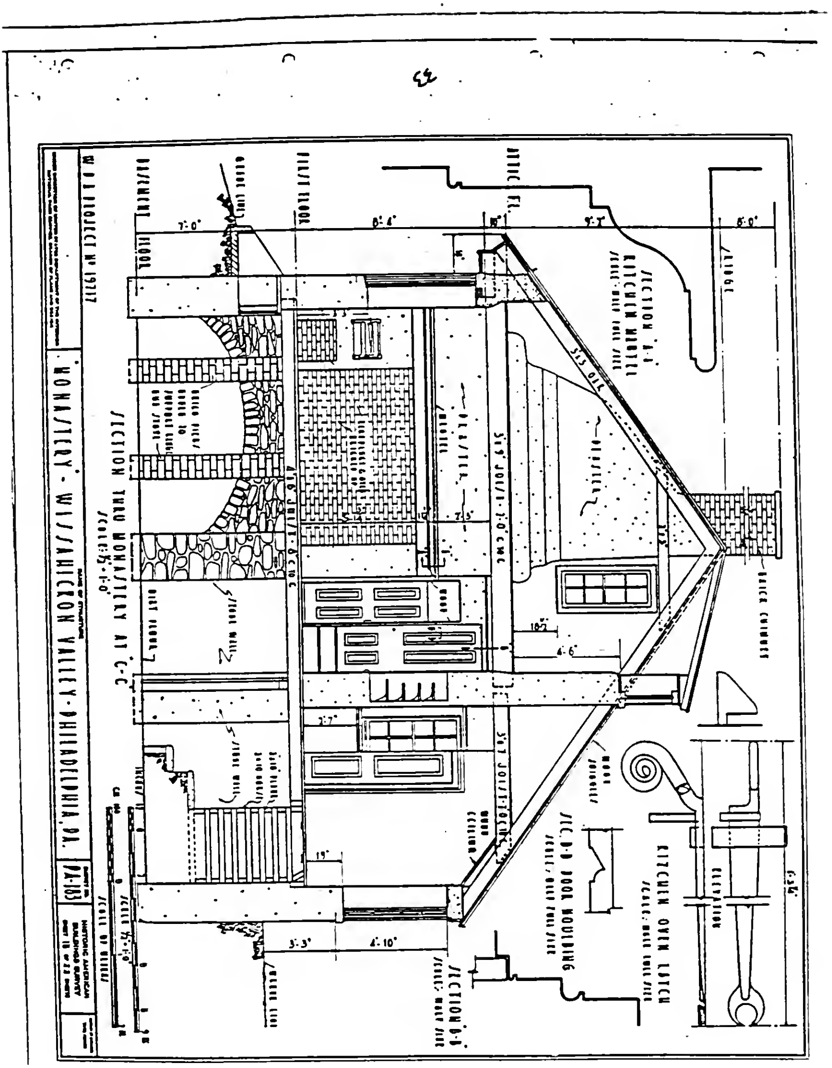

MONASTERY WISSAHICKON VALLEY-PHILADELPHIA, PA.
NORTH WEST ELEVATION
PA-183

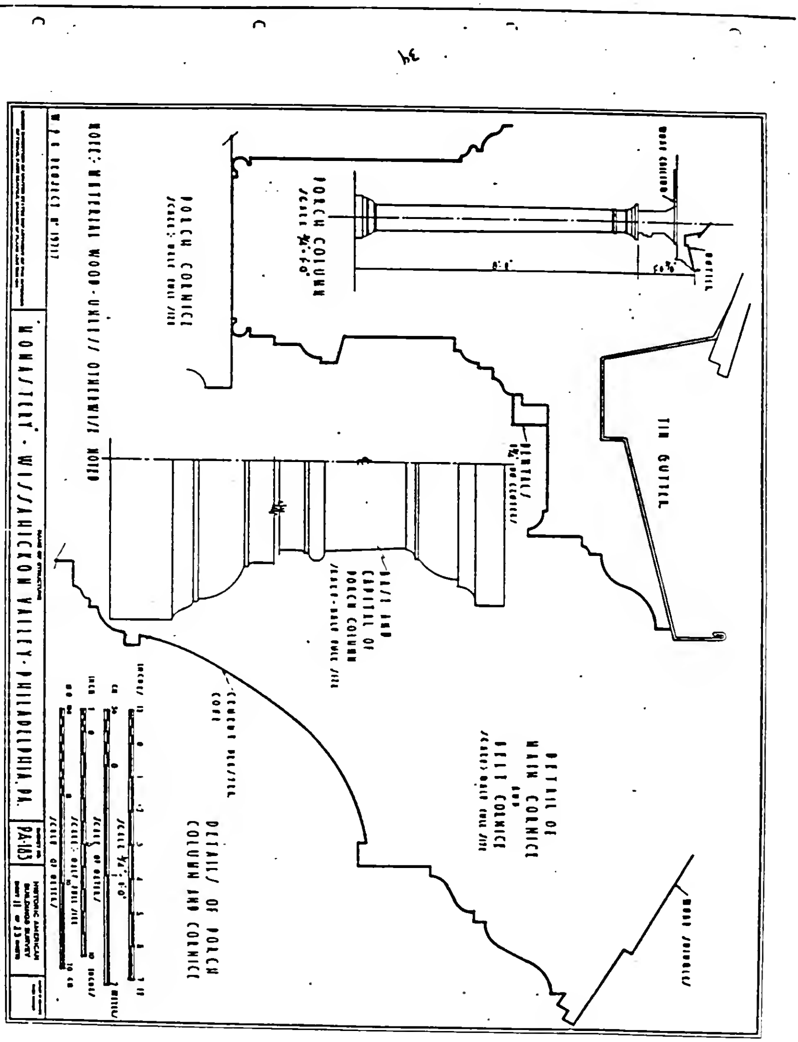


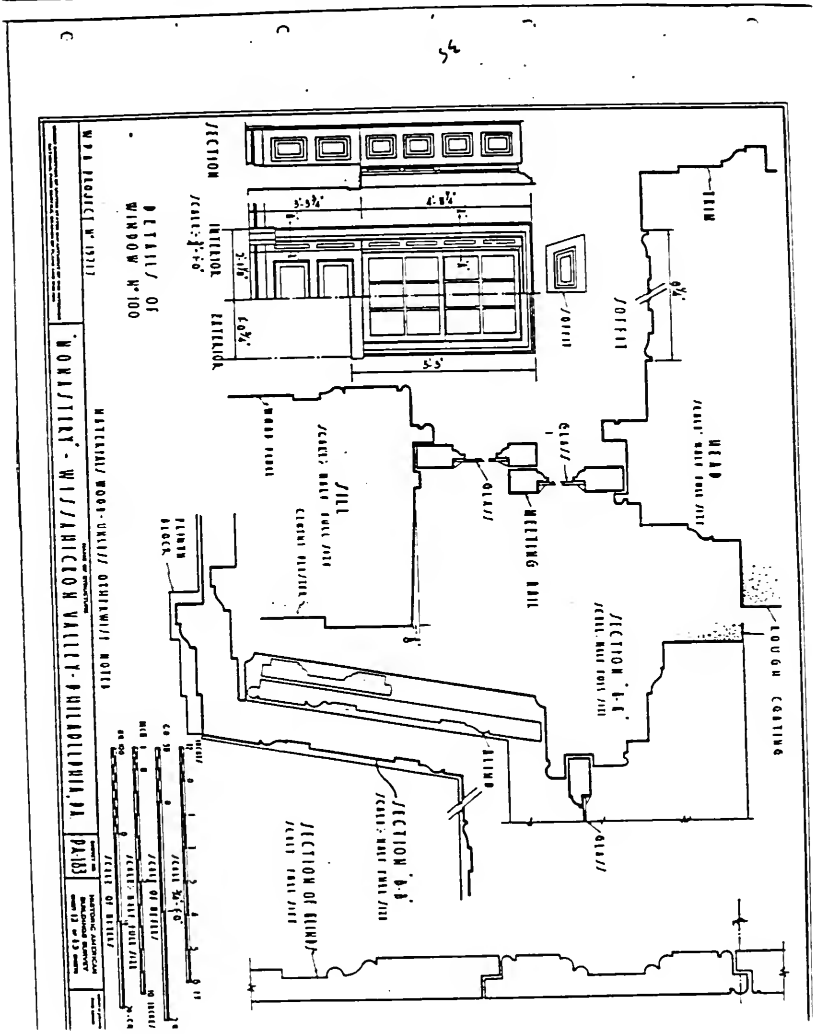
SOUTH EAST ELEVATION
MONASTERY - WISSAHICKON VALLEY - PHILADELPHIA, PA
PA-183
HISTORIC AMERICAN BUILDINGS SURVEY



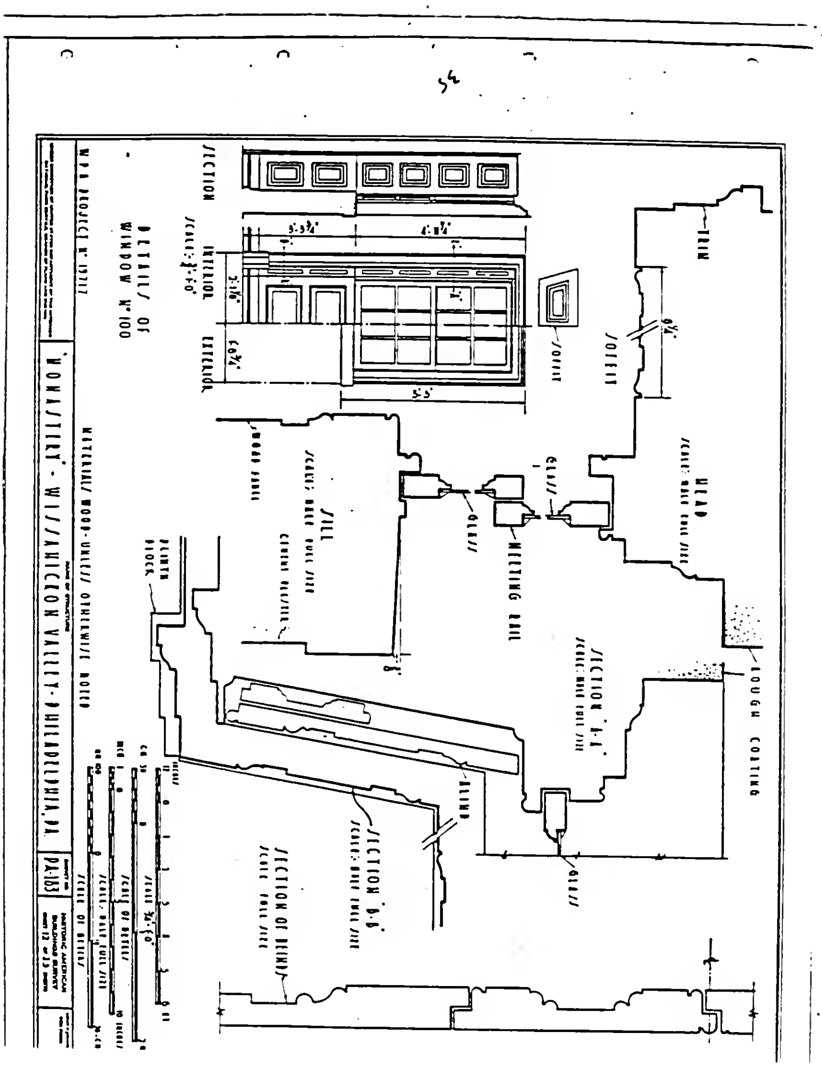
MONASTERY - WISSAHICKON VALLEY - PHILADELPHIA, PA.
REAR NORTH EAST ELEVATION
PA-183
HISTORIC AMERICAN BUILDINGS SURVEY


MONASTERY - WISSAHICKON VALLEY - PHILADELPHIA, PA.
SECTION THRU MONASTERY AT C-C
W.P.A. PROJECT Nº 19717
PA-183
HISTORIC AMERICAN BUILDINGS SURVEY
SECTION A-A KITCHEN MANTEL
SECTION D-D DOOR MOULDING
KITCHEN OVEN LATCH
SECTION B-B
BRICK CHIMNEY
STONE WALL

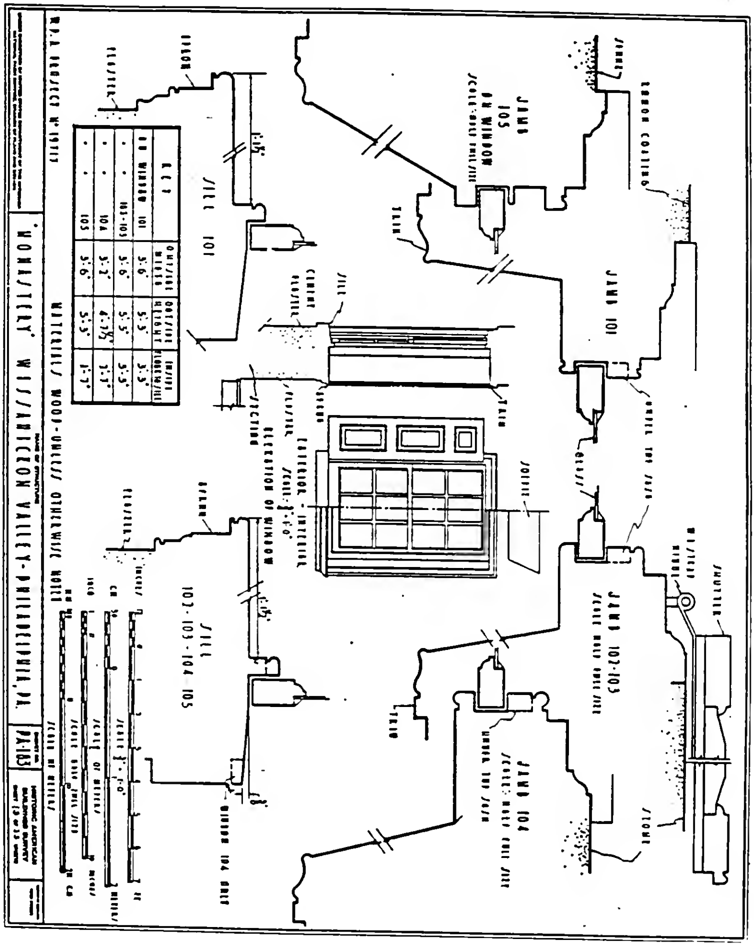

34
MONASTERY - WISSAHICKON VALLEY - PHILADELPHIA, PA.
PA-185
HISTORIC AMERICAN BUILDINGS SURVEY
NOTE: MATERIAL WOOD - UNLESS OTHERWISE NOTED
PORCH CORNICE
PORCH COLUMN
TIN GUTTER
DETAIL OF MAIN CORNICE AND BELT CORNICE
DETAILS OF PORCH COLUMN AND CORNICE

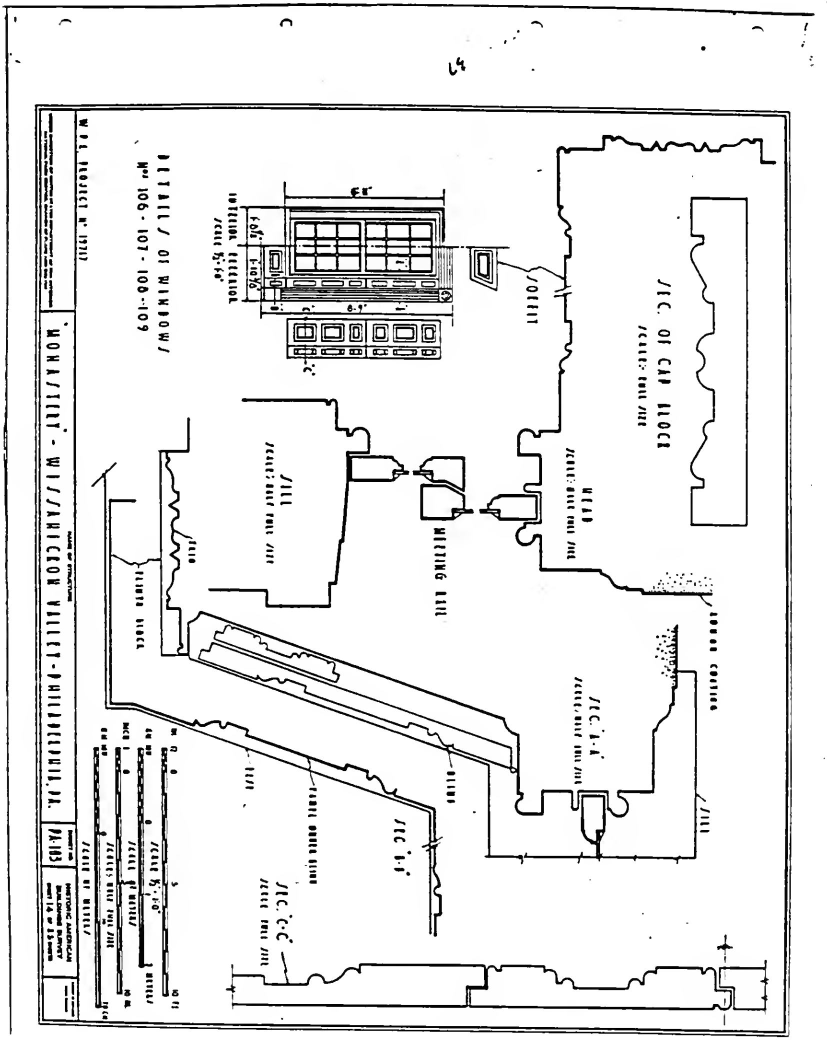


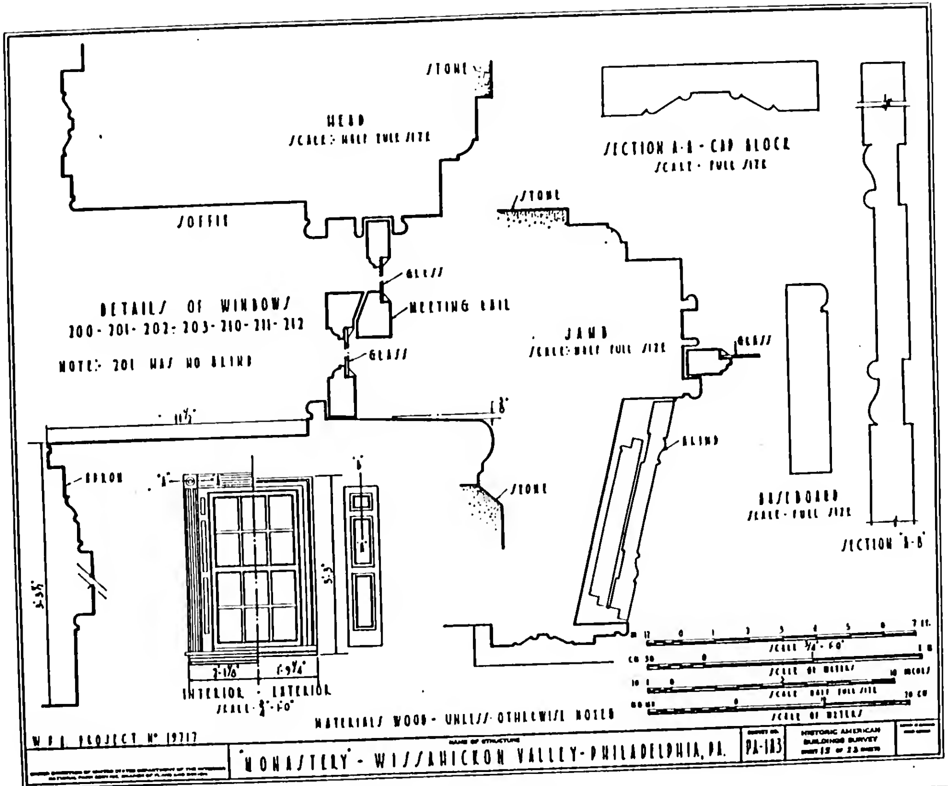
ROUGH COATING
TRIM
HEAD
SOFFIT
SECTION "A-A"
GLASS
MEETING RAIL
BLIND
SECTION "B-B"
SILL
SECTION OF BLINDS
WOOD FLOOR
PLINTH BLOCK
SECTION
INTERIOR
EXTERIOR
DETAILS OF
WINDOW N° 100
MATERIALS WOOD UNLESS OTHERWISE NOTED
W P A PROJECT N° 19717
"MONASTERY" - WISSAHICKON VALLEY - PHILADELPHIA, PA.
PA-183
HISTORIC AMERICAN BUILDINGS SURVEY

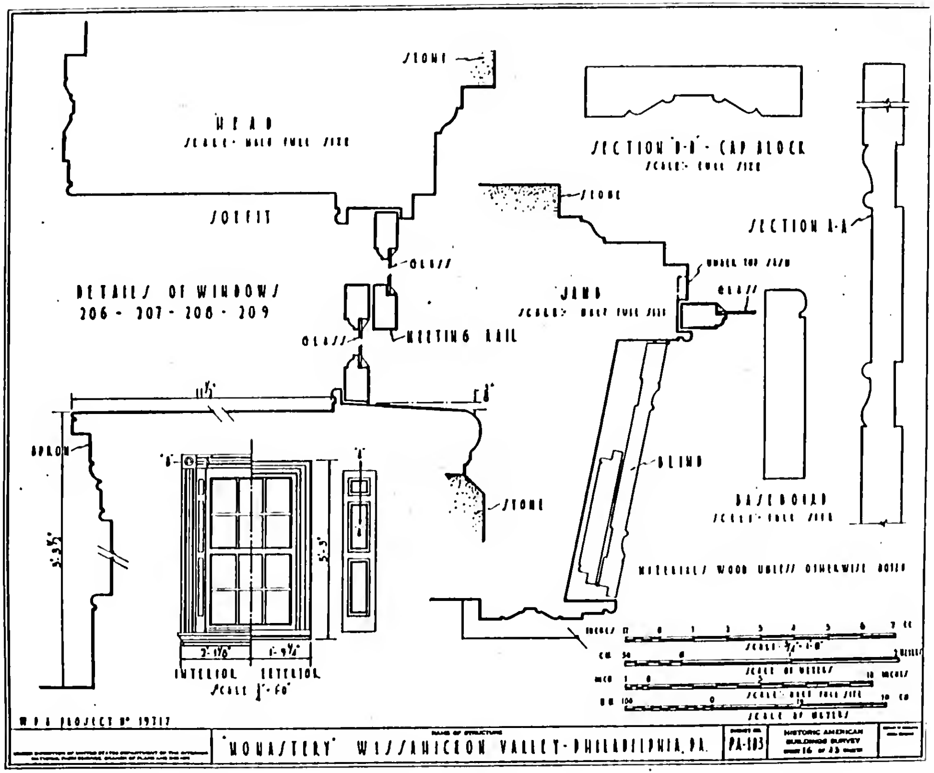

MONASTERY - WISSAHICKON VALLEY - PHILADELPHIA, PA.
PA-183
DETAILS OF WINDOW N° 100
SECTION
INTERIOR
EXTERIOR
SOFFIT
TRIM
HEAD
SILL
GLASS
MEETING RAIL
PLINTH BLOCK
ROUGH COATING
SECTION "A-A"
SECTION "B-B"
SECTION OF BENDS
HISTORIC AMERICAN BUILDINGS SURVEY

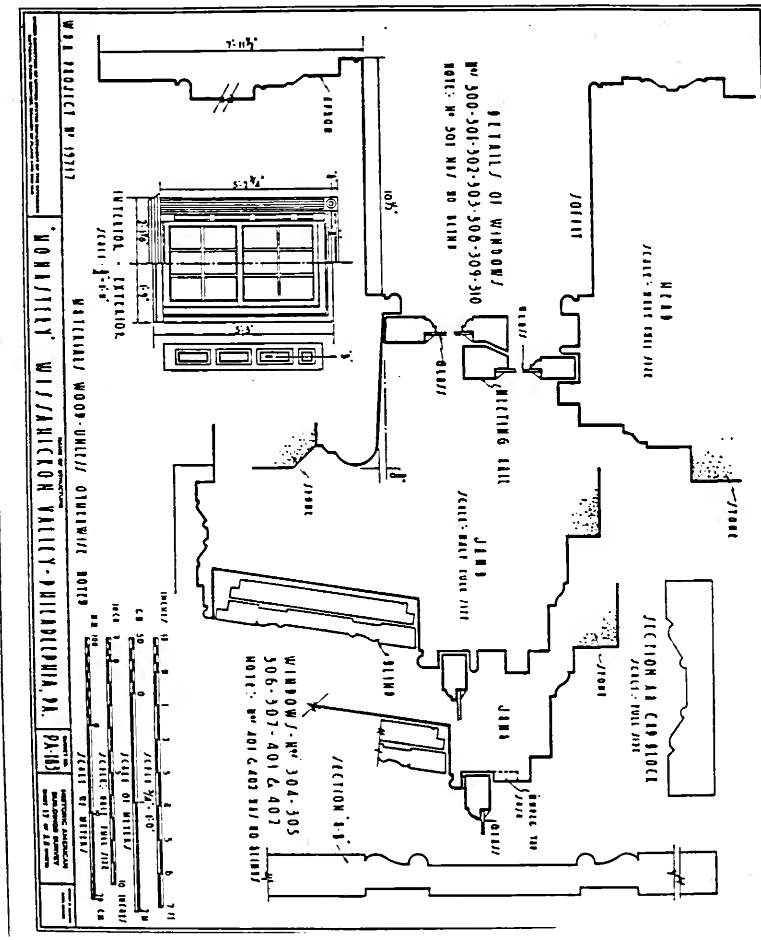
36

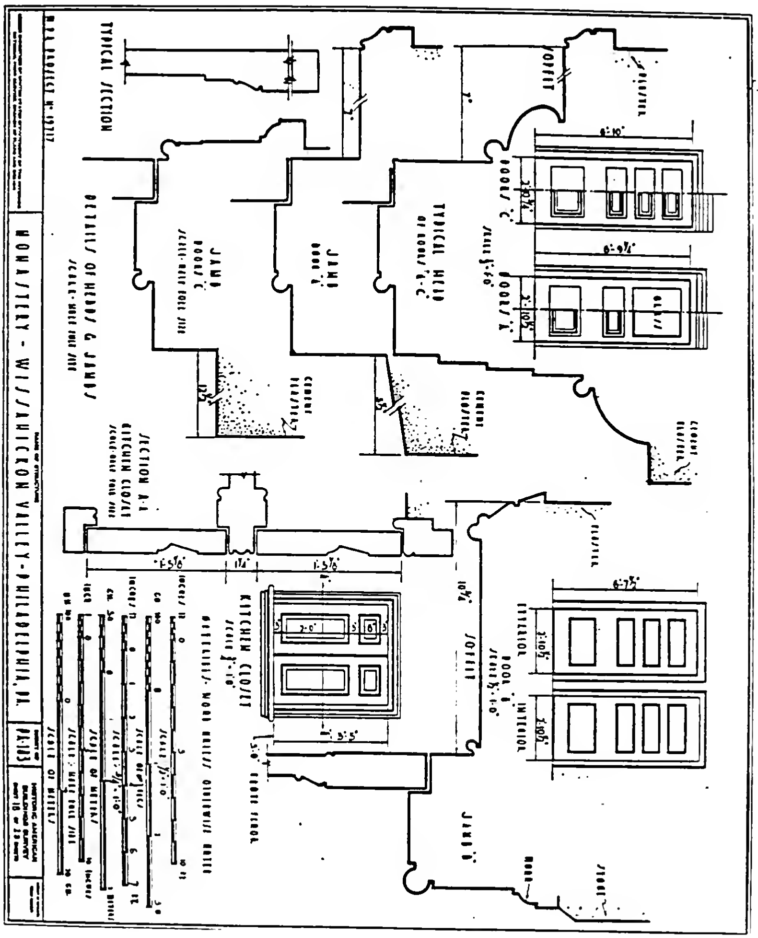

SHUTTER
WEATHER HINGE
STONE
JAMB 102-103
SCALE HALF FULL SIZE
JAMB 101
UNDER THE SASH
GLASS
CANVAS COATING
JAMB 105
ON WINDOW
SCALE: HALF FULL SIZE
JAMB 104
SCALE: HALF FULL SIZE
UNDER THE SASH
TRIM
SOFFIT
SILL
CEMENT PLASTER
APRON
PLASTER
SECTION
EXTERIOR - INTERIOR
ELEVATION OF WINDOW
SILL 101
SILL
102 - 103 - 104 - 105
WINDOW 104 ONLY
KEY
OUTSIDE WIDTH
OUTSIDE HEIGHT
INSIDE FLOOR TO SILL
ON WINDOW 101
3'-6"
5'-3"
3'-3"
102-103
3'-6"
5'-3"
3'-3"
104
3'-2"
4'-7½"
1'-7"
105
3'-6"
5'-3"
1'-7"
SCALE OF METERS
W.P.A. PROJECT Nº 19717
MATERIALS WOOD-UNLESS OTHERWISE NOTED
"MONASTERY" WISSAHICKON VALLEY-PHILADELPHIA, PA.
PA-183
HISTORIC AMERICAN BUILDINGS SURVEY


DETAILS OF WINDOWS
Nos 106 - 107 - 108 - 109
MONASTERY - WISSAHICKON VALLEY - PHILADELPHIA, PA.
SEC. OF CAP BLOCK
SOFFIT
HEAD
SILL
MEETING RAIL

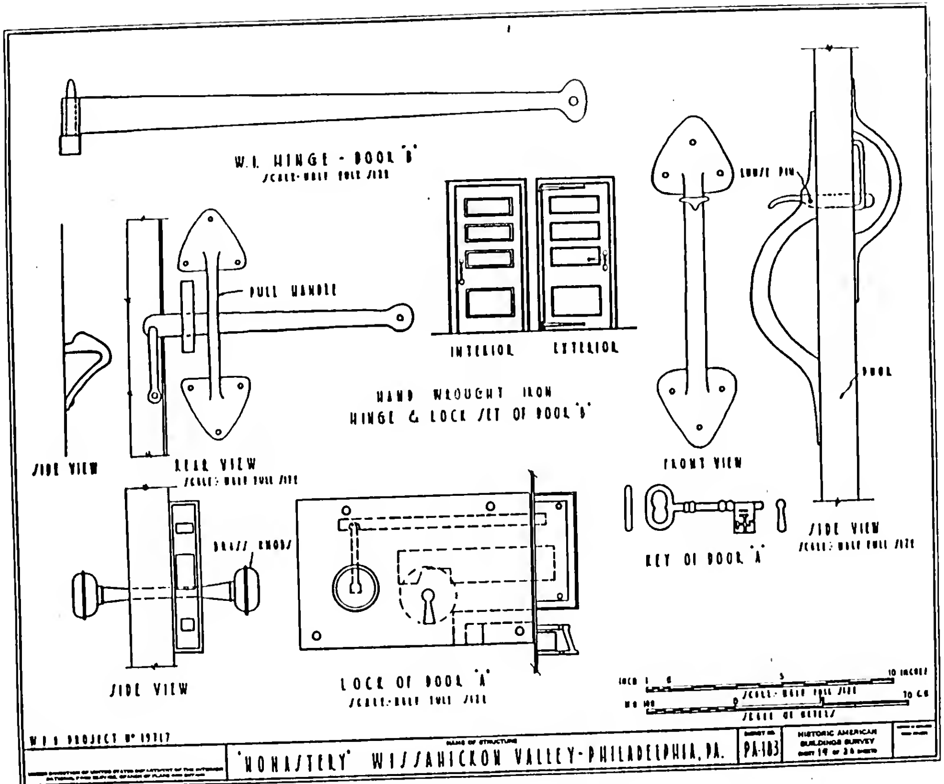

STONE
HEAD
SCALE: HALF FULL SIZE
SOFFIT
SECTION A-A - CAP BLOCK
SCALE - FULL SIZE
STONE
GLASS
MEETING RAIL
DETAILS OF WINDOWS
200-201-202-203-210-211-212
NOTE: 201 HAS NO BLIND
GLASS
JAMB
SCALE: HALF FULL SIZE
GLASS
BLIND
APRON
STONE
BASEBOARD
SCALE - FULL SIZE
SECTION "B-B"
INTERIOR - EXTERIOR
MATERIALS WOOD - UNLESS OTHERWISE NOTED
SCALE OF METERS
W.P.A. PROJECT Nº 19717
"MONASTERY" - WISSAHICKON VALLEY - PHILADELPHIA, PA.
PA-183
HISTORIC AMERICAN BUILDINGS SURVEY

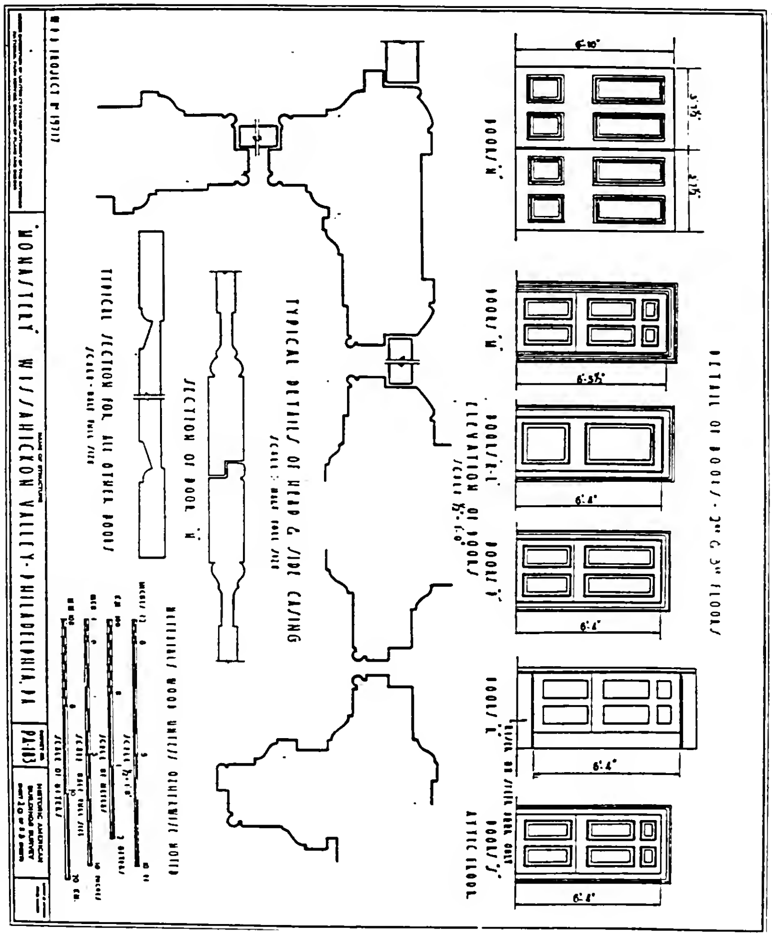

HEAD
SCALE: HALF FULL SIZE
SOFFIT
DETAILS OF WINDOWS
206 - 207 - 208 - 209
GLASS
MEETING RAIL
STONE
JAMB
SECTION B-B' - CAP BLOCK
SCALE: FULL SIZE
SECTION A-A
BLIND
BASEBOARD
MATERIALS WOOD UNLESS OTHERWISE NOTED
APRON
INTERIOR
EXTERIOR
W.P.A. PROJECT No 19717
"MONASTERY" WISSAHICKON VALLEY-PHILADELPHIA, PA.
HISTORIC AMERICAN BUILDINGS SURVEY

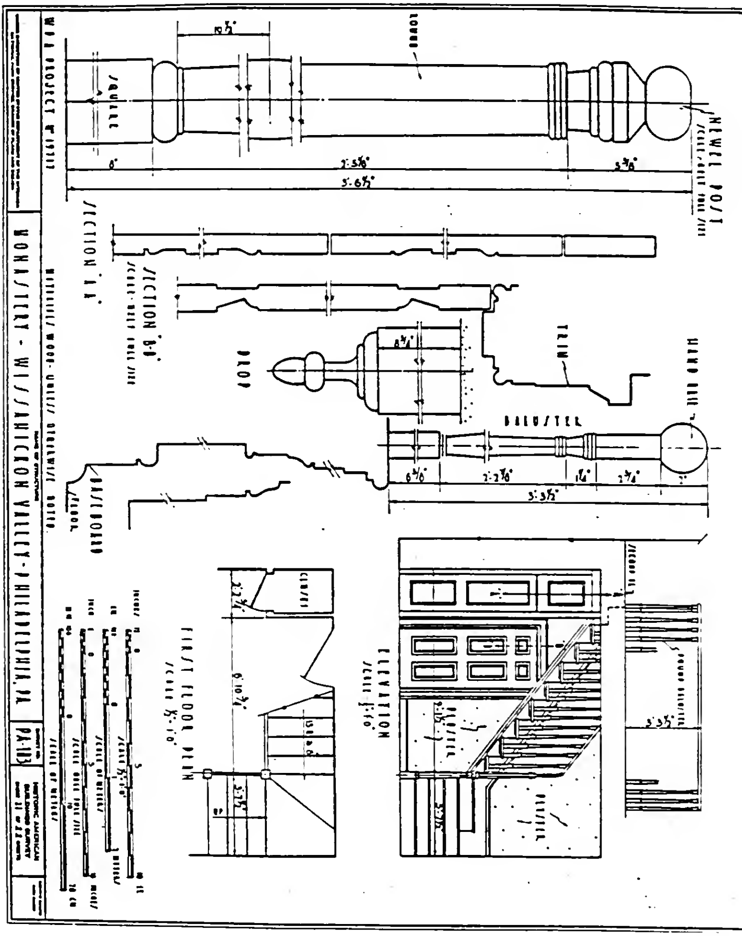

HEAD
SOFFIT
GLASS
MEETING RAIL
DETAILS OF WINDOWS
Nos 300-301-302-303-308-309-310
NOTE:- No 301 HAS NO BLIND
JAMB
SECTION AA CAP BLOCK
SCALE:- FULL SIZE
STONE
BLIND
APRON
SECTION B-B
WINDOWS-Nos 304-305
306-307-401 & 402
NOTE:- Nos 401 & 402 HAS NO BLINDS
INTERIOR - EXTERIOR
MATERIALS WOOD-UNLESS OTHERWISE NOTED
W.P.A. PROJECT No 19717
"MONASTERY" WISSAHICKON VALLEY-PHILADELPHIA, PA.
PA-183
HISTORIC AMERICAN BUILDINGS SURVEY



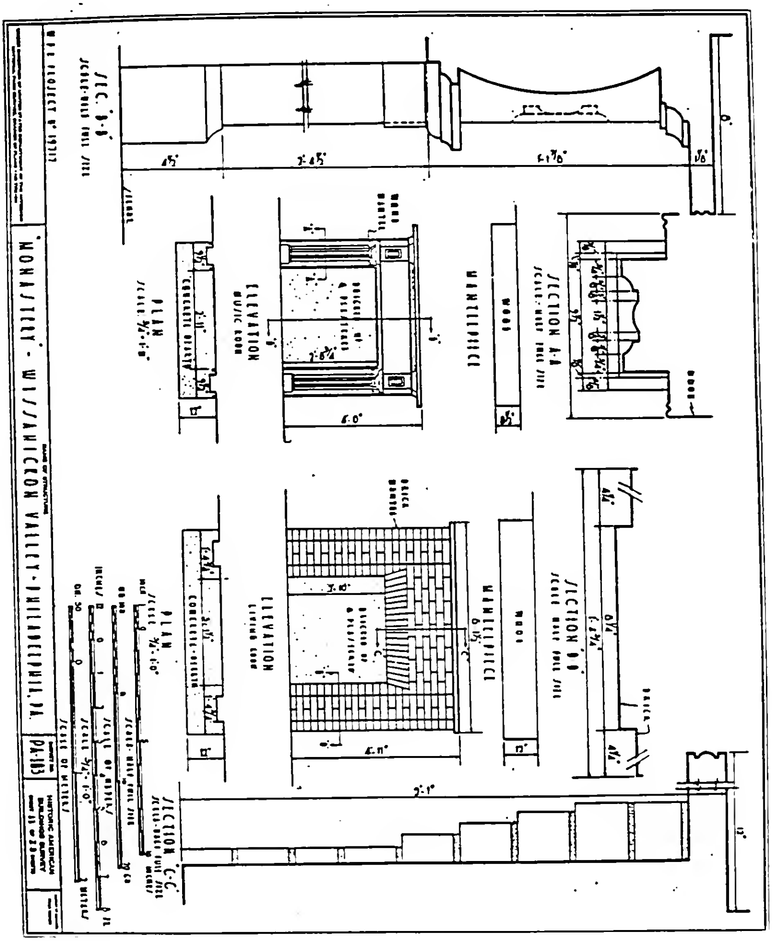
MONASTERY - WISSAHICKON VALLEY - PHILADELPHIA, PA.
DETAILS OF HEADS & JAMBS
TYPICAL SECTION
KITCHEN CLOSET
SOFFIT
PA-183

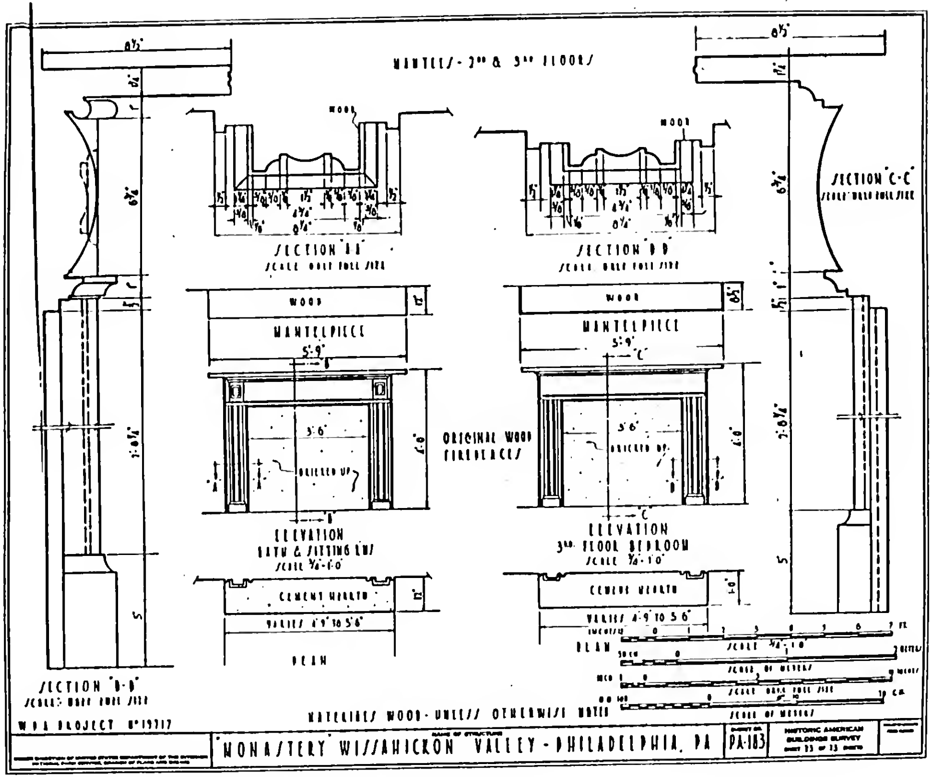

W.I. HINGE - DOOR "B"
SCALE-HALF FULL SIZE
PULL HANDLE
SIDE VIEW
REAR VIEW
SCALE: HALF FULL SIZE
INTERIOR
EXTERIOR
HAND WROUGHT IRON
HINGE & LOCK SET OF DOOR "B"
FRONT VIEW
LOOSE PIN
DOOR
SIDE VIEW
SCALE: HALF FULL SIZE
BRASS KNOBS
SIDE VIEW
LOCK OF DOOR "A"
SCALE-HALF FULL SIZE
KEY OF DOOR "A"
SCALE OF METERS
10 INCHES
W.P.A. PROJECT No 19717
NAME OF STRUCTURE
"MONASTERY" WISSAHICKON VALLEY-PHILADELPHIA, PA.
PA-103
HISTORIC AMERICAN BUILDINGS SURVEY


MONASTERY WISSAHICKON VALLEY-PHILADELPHIA, PA
PA-183
HISTORIC AMERICAN BUILDINGS SURVEY
TYPICAL DETAILS OF HEAD & SIDE CASING
TYPICAL SECTION FOR ALL OTHER DOORS
SECTION OF DOOR "N"
DETAIL OF DOORS - 2nd & 3rd FLOORS
ELEVATION OF DOORS
ATTIC FLOOR
6'-4"
6'-10"



NEWEL POST
SECTION A-A
SECTION B-B
DROP
TRIM
HAND RAIL
BALUSTER
BASEBOARD
FIRST FLOOR PLAN
ELEVATION
MONASTERY - WISSAHICKON VALLEY - PHILADELPHIA, PA.
HISTORIC AMERICAN BUILDINGS SURVEY


SECTION A-A
SCALE: HALF FULL SIZE
MANTELPIECE
WOOD
ELEVATION
MUSIC ROOM
PLAN
SCALE 3/4"-1'-0"
CONCRETE HEARTH
SECTION B-B
SCALE HALF FULL SIZE
ELEVATION
LIVING ROOM
BRICK MANTEL
WOOD MANTEL
SEC. D-D
SCALE-HALF FULL SIZE
SECTION C-C
SCALE-HALF FULL SIZE
SCALE OF METERS
MONASTERY - WISSAHICKON VALLEY - PHILADELPHIA, PA.
PA-183
HISTORIC AMERICAN BUILDINGS SURVEY

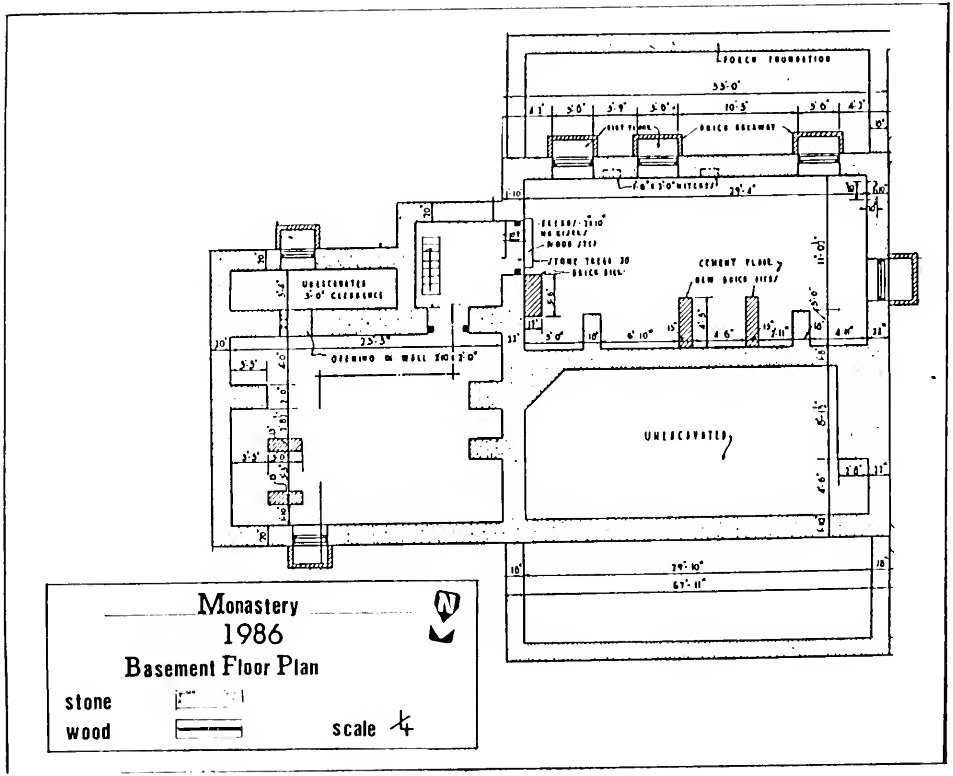

MANTELS - 2ND & 3RD FLOORS
SECTION "A-A"
SCALE HALF FULL SIZE
SECTION "B-B"
SCALE HALF FULL SIZE
SECTION "C-C"
SCALE HALF FULL SIZE
SECTION "D-D"
SCALE HALF FULL SIZE
WOOD
MANTELPIECE
5'-9"
3'-6"
4'-0"
ORIGINAL WOOD FIREPLACES
ELEVATION
BATH & SITTING RMS
SCALE 3/4"-1'-0"
ELEVATION
3RD FLOOR BEDROOM
SCALE 3/4"-1'-0"
CEMENT HEARTH
VARIES 4'-9" TO 5'-6"
PLAN
MATERIALS WOOD - UNLESS OTHERWISE NOTED
W.P.A. PROJECT No 19717
MONASTERY WISSAHICKON VALLEY - PHILADELPHIA, PA
PA-183
HISTORIC AMERICAN BUILDINGS SURVEY

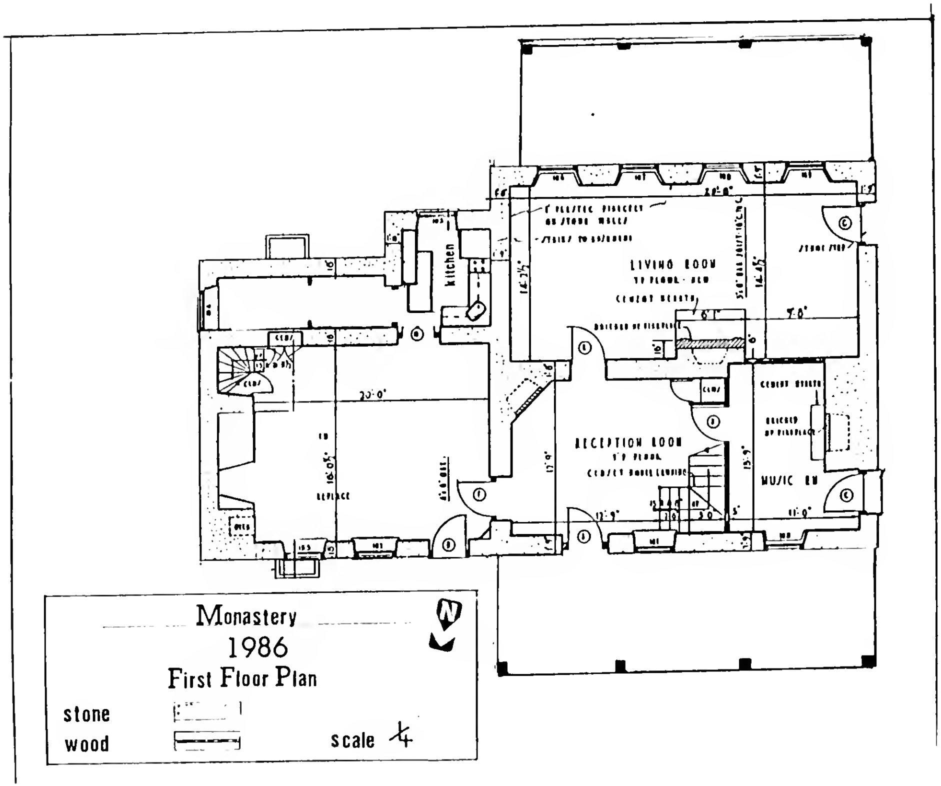
Appendix #7

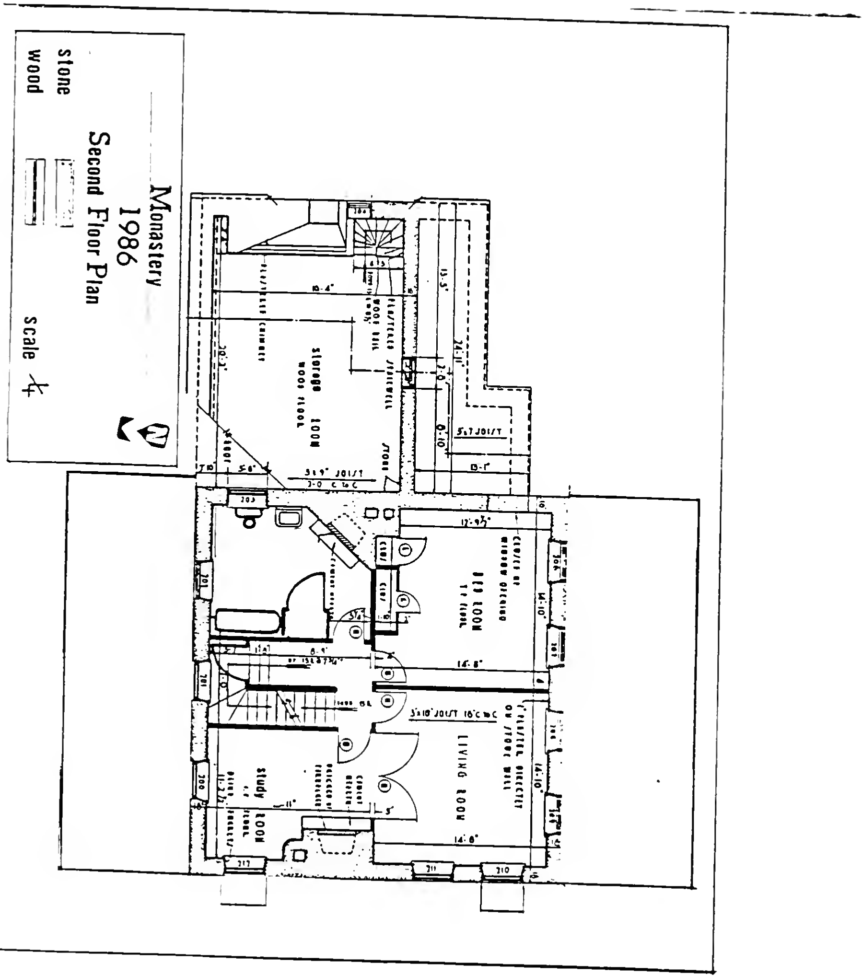
Monastery

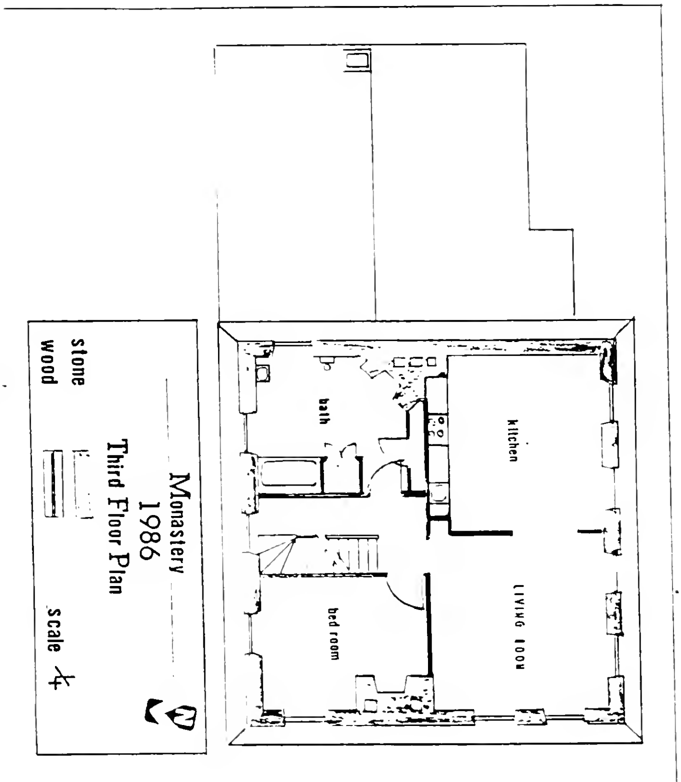
1986 Floor Plans

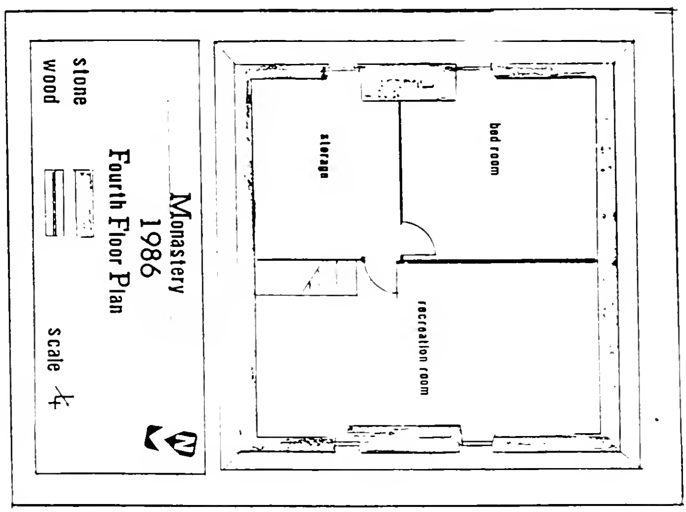
The 1986 floor plans are based on the Historic American Building Survey drawings and the present configuration of the building


Monastery
1986
Basement Floor Plan
stone
wood
scale
UNEXCAVATED
CEMENT FLOOR
55'-0"
29'-10"
67'-11"
23'-3"
29'-4"


kitchen
LIVING ROOM
RECEPTION ROOM
MUSIC RM
20'0"
17'9"
13'9"
7'0"
11'0"
Monastery
1986
First Floor Plan
stone
wood
scale

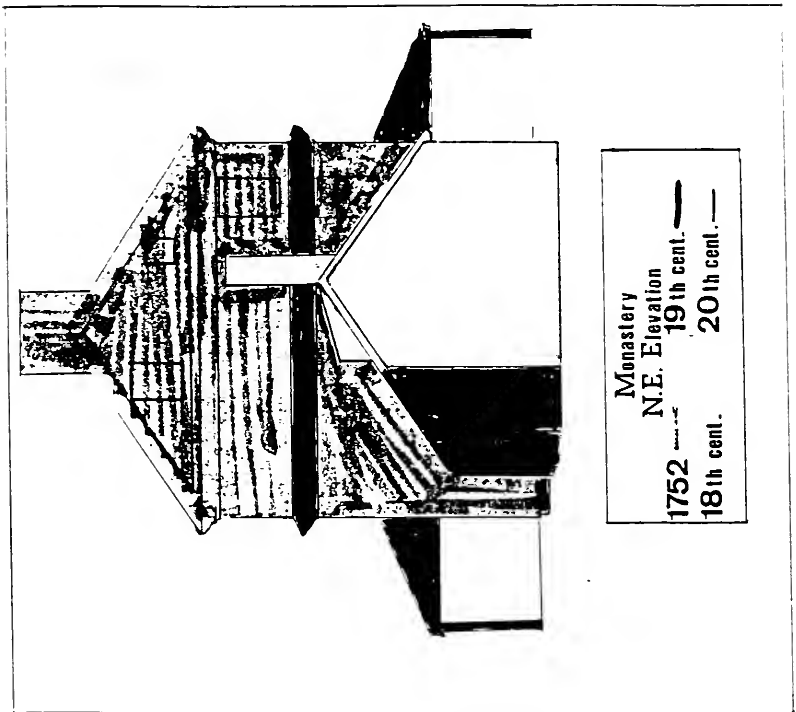

Monastery
1986
Second Floor Plan
stone
wood
scale
storage ROOM
LIVING ROOM
study ROOM

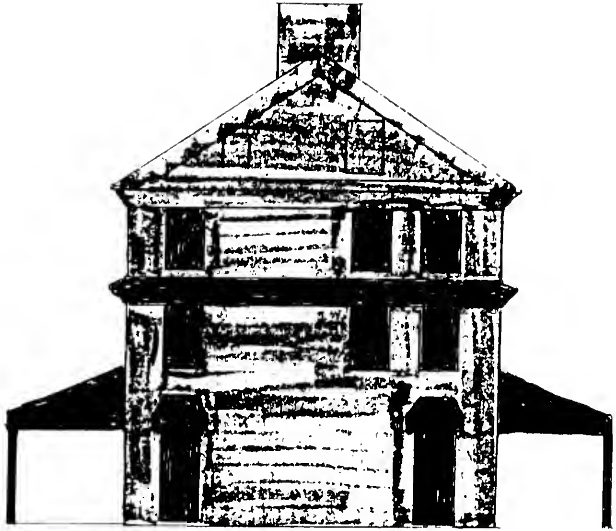

Monastery
1986
Third Floor Plan
stone
wood
scale
bath
kitchen
living room
bed room


Monastery
1986
Fourth Floor Plan
stone
wood
scale
storage
bed room
recreation room

Appendix #8

Monastery Building Alterations

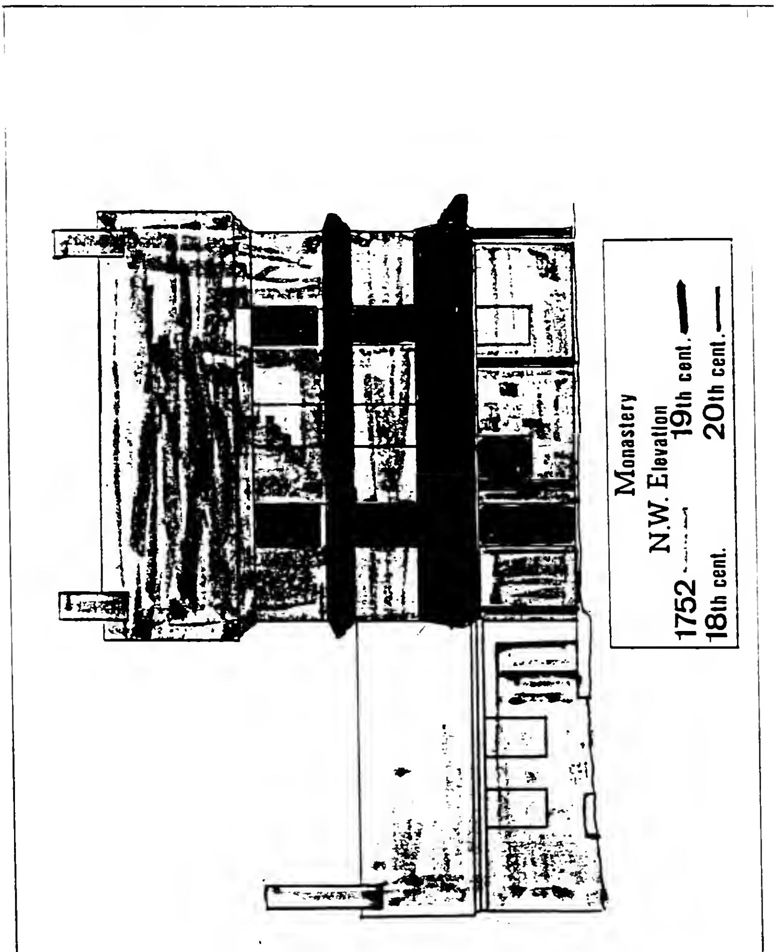

Monastery
N.E. Elevation
1752
19th cent.
18th cent.
20th cent.



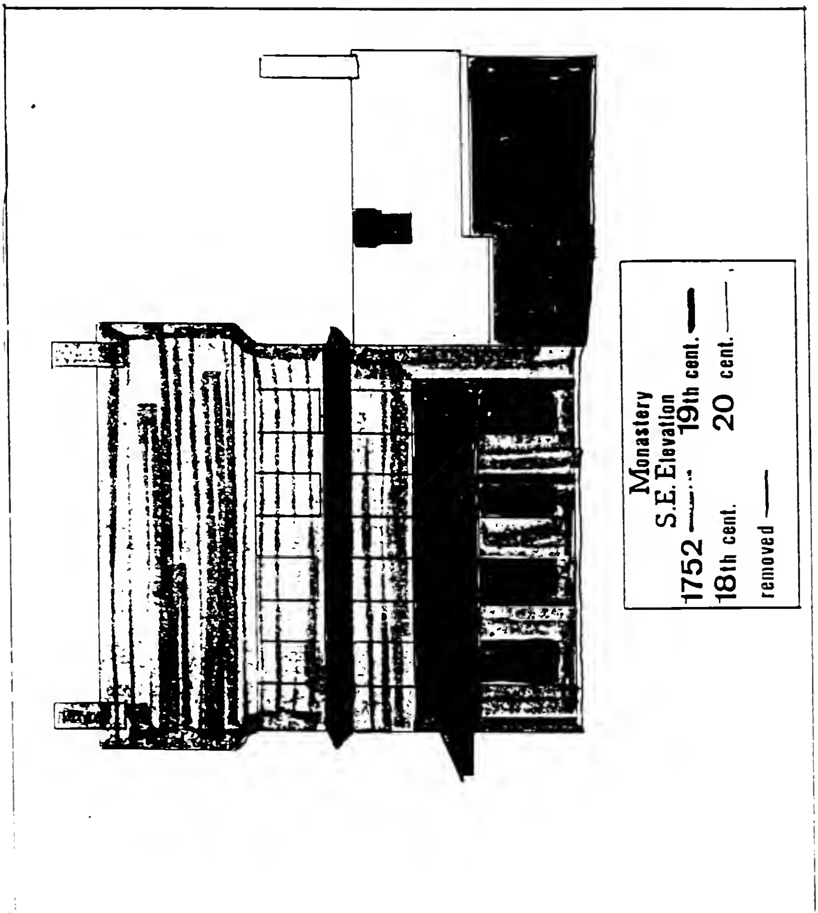
Monastery
S.W. Elevation

1752 ---- 18th cent.
19th cent. ▬▬
20th cent. ——

55



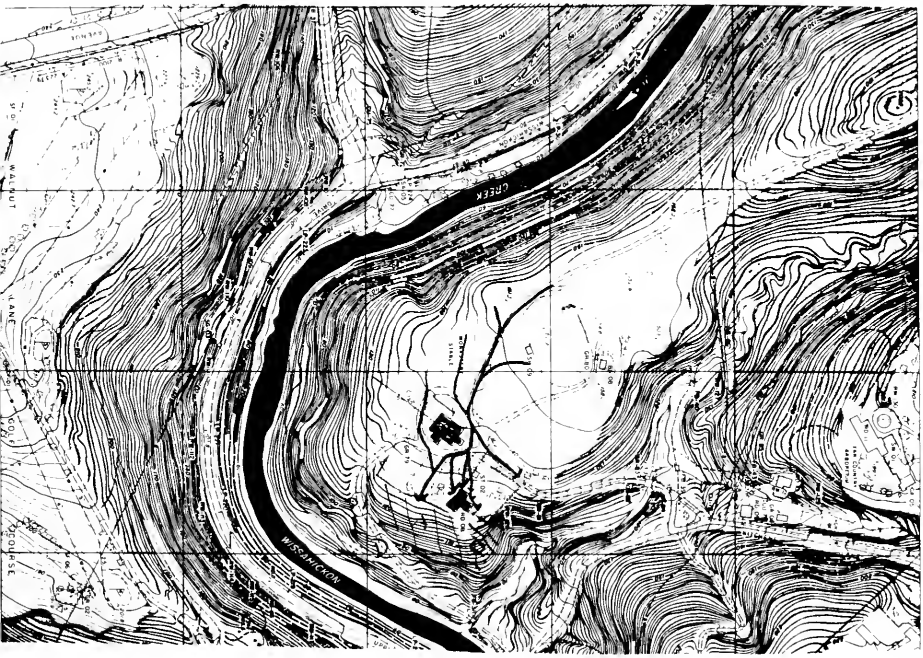
54


Monastery
S.E. Elevation
1752
19th cent.
18th cent.
20 cent.
removed

Appendix #9

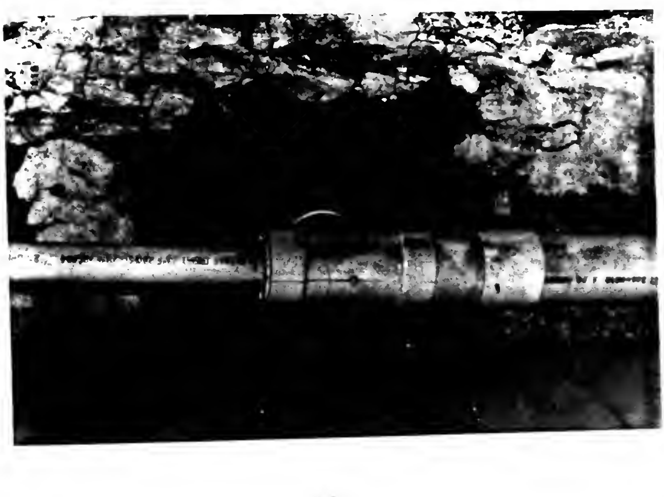
Ground Drainage

One of the problems facing the Monastery is ground water entering the building. This topographical map with the red arrows shows how the water drains on this site. The drainage problem could be eliminated through regrading of the area so that water was directed into existing storm drains. Following photographs demonstrate drainage patterns into the back yard of the building.



Appendix 6.4
Structural Traci

Crack found in the main building wall looking from the loft above the kitchen. Below the structural crack plumbing and heating pipes have been introduced through the main buildings exterior wall.



Appendix #11
Exterior Maintenance Problems

The Monastery

Northwest nd Southwest Elevation

The building needs gutters, repointing and repainting. The effect of rising damp are seen on the southwest elevation.

Southeast Elevation

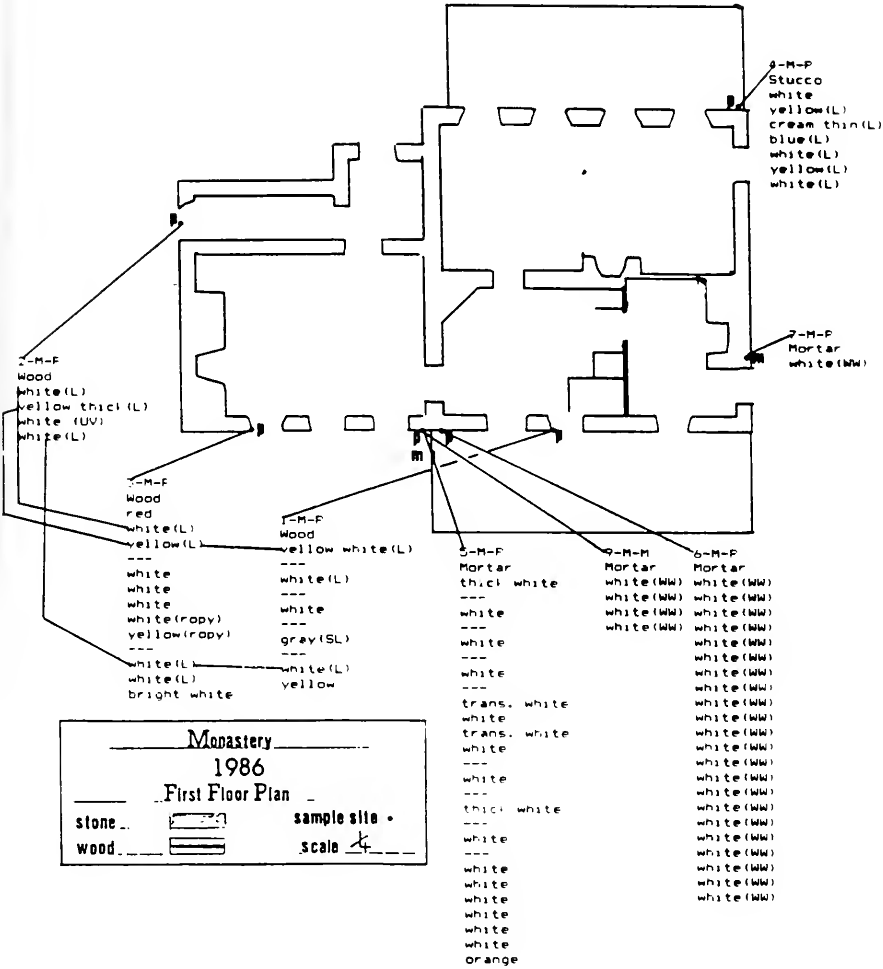
The cornices and porch need repainting. The stucco on the first story needs to removed and the wall underneath repaired.

Northeast Elevation

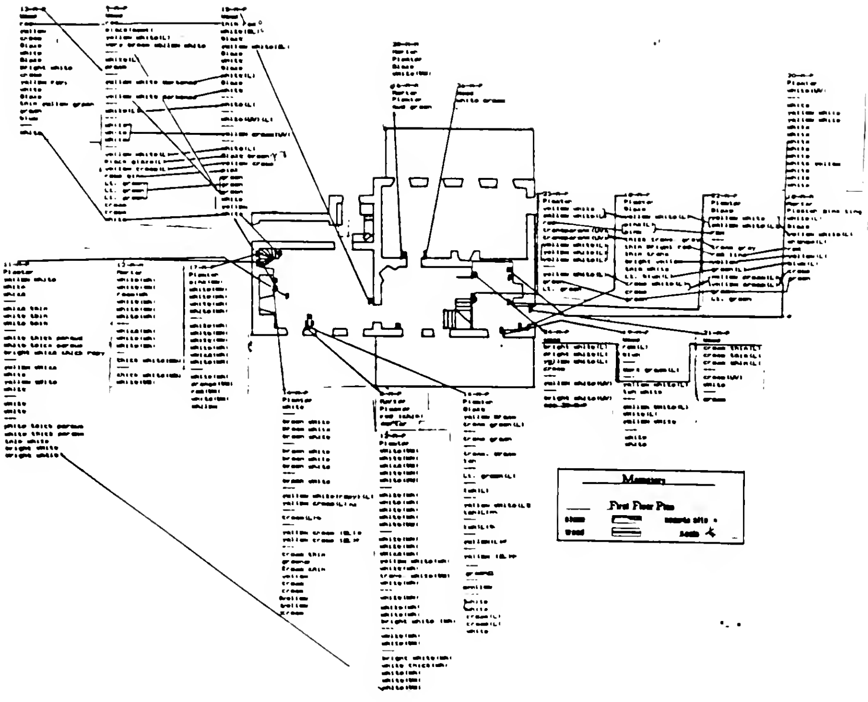
The peaks on the main building and the kitchen wing need repointing.

Appendix #12

Monastery Paint Stratigraphy



8-M-P
Stucco
white
yellow(L)
cream thin(L)
blue(L)
white(L)
yellow(L)
white(L)
7-M-P
Mortar
white(WW)
2-M-F
Wood
white(L)
yellow thick(L)
white (UV)
white(L)
3-M-F
Wood
red
white(L)
yellow(L)
---
white
white
white
white(ropy)
yellow(ropy)
---
white(L)
white(L)
bright white
1-M-F
Wood
yellow white(L)
---
white(L)
---
white
---
gray(SL)
---
white(L)
yellow
5-M-F
Mortar
thick white
---
white
---
white
---
white
---
trans. white
white
trans. white
white
---
white
---
thick white
---
white
---
white
white
white
white
white
white
orange
9-M-M
Mortar
white(WW)
white(WW)
white(WW)
white(WW)
6-M-F
Mortar
white(WW)
white(WW)
white(WW)
white(WW)
white(WW)
white(WW)
white(WW)
white(WW)
white(WW)
white(WW)
white(WW)
white(WW)
white(WW)
white(WW)
white(WW)
white(WW)
white(WW)
white(WW)
white(WW)
white(WW)
white(WW)
white(WW)
Monastery
1986
First Floor Plan
stone
wood
sample site
scale



Appendix #13

Monastery Paint Data Sheets

Phase I: Sequence of Layers l-m-p
Structure Monastery
Location of Sample – Exterior NW Wall, Shutter center window W main building
Date Removed April 1988 Removed By MV
Significant Facts Regarding The Structure's History Which May Pertain The To The Analysis (dateconstructed, significant alterations, dates painted)
Compare to kitchen paint sample

DATA: Microscopic Analysis

CODES		Reaction of		
-Finish	(F)		Sodium Sulfide	(Na_2S)
Primer	(P)		Hydrochloric Acid	(HCI)
Glaze	(G)		Dimethylformamide	(DMF)
Varnish	(V)		Methylene Chloride	(CH_2CL_2)
Shellac	(S)		Water	(H_2O)
Wall paper	(W)		Alcohol	(OH)
Fracture	( )		Turentine	(TURP)
Dirt Layer	(-)		Near UV Light	(UV)

Note layers of decorative painting, if any: (graining, marbleizing, polychromy ect.).

Chromochronology	Comments		Chromochronology	Comments
Substrate: Wood				
1. Yellow white	Na_2S	16.		
2. White	Na_2S	17.		
3. white	–	18.		
4. gray	slight	19.		
5. white	Na_2S	20.		
6. yellow	–	21.		
7.		22.		
8.		23.		
9.		24.		
10.		25.		
11.		26.		
12.		27.		
13.		28.		
14.		29.		
15.		30.		

Summary:

A 96886367 D

Phase II: Analysis and Recommendations 1-m-p

Structure Monastery

Location of Sample Shutter main blds.

Date Removed April 1988 Removed By MY

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis

No. of Layers to be Studied

Reason for Layer Selection:

Visual Characteristics of Layer to be Matched: (relative thinness, thickness glassiness, ropiness, ect.):

MEDIUM ANALYSIS: (Separate paint/finishlayer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil	DME	Softened
Latex		
Whitewash/calcimine		
Waterbased/distemper		
Varnish		
Shellac		

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes___no___. Color

Probable pigment associated with flourescence:

Possible Pigment Type	Spot Test	Reaction
lead white	KI	yellow ppt

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): lead white

Probable medium: linseed oil

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if approprate.)

Butens paint color Robin Egg (13th 22(w)) Sherwin-Williams

RECOMMENDATIONS

Color:

Paint Type:

DOCUMENTATION

Sample/slide NO:

Report prepared - Date: [illegible] 23 88 By Whom: MT

Phase I: Sequence of Layers 2-m-p
Structure Monastery
Location of Sample Exterior NW Wall Kitchen first floor window
Date Removed April 1988 Removed By MV
Significant Facts Regarding The Structure's History Which May Pertain The To The Analysis (dateconstructed, significant alterations, dates painted)
may have been moved

DATA: Microscopic Analysis

CODES		Reaction of	
-Finish	(F)	Sodium Sulfide	(Na_2S)
Primer	(P)	Hydrochloric Acid	(HCl)
Glaze	(G)	Dimethylformamide	(DMF)
Varnish	(V)	Methylene Chloride	(CH_2CL_2)
Shellac	(S)	Water	(H_2O)
Wall paper	(W)	Alcohol	(OH)
Fracture	( )	Turentine	(TURP)
Dirt Layer	(-)	Near UV Light	(UV)

Note layers of decorative painting, if any: (graining, marbleizing, polychromy ect.).

Chromochronology		Comments			Chromochronology	Comments
Substrate: wood		Na2S				
1. white	+	DMF	HNO_3		16.	
2. yellow thick	+		HNO_3		17. fluoresces	
3. white		DMF	HNO_3 - fluoresces		18.	
4. white	+	DMF			19.	
5.					20.	
6.					21.	
7.					22.	
8.					23.	
9.					24.	
10.					25.	
11.					26.	
12.					27.	
13.					28.	
14.					29.	
15.					30.	

Summary: sample fractured and hard to read

Phase I: Sequence of Layers 3-m-P
Structure Monastery
Location of Sample NW Wall kitchen wing east window
Date Removed April 1988 Removed By MJ
Significant Facts Regarding The Structure's History Which May Pertain The To The Analysis (dateconstructed, significant alterations, dates painted)
to see if window

DATA: Microscopic Analysis

CODES		Reaction of	
-Finish	(F)	Sodium Sulfide	(Na_2S)
Primer	(P)	Hydrochloric Acid	(HCl)
Glaze	(G)	Dimethylformamide	(DMF)
Varnish	(V)	Methylene Chloride	(CH_2CL_2)
Shellac	(S)	Water	(H_2O)
Wall paper	(W)	Alcohol	(OH)
Fracture	( )	Turentine	(TURP)
Dirt Layer	(-)	Near UV Light	(UV)

Note layers of decorative painting, if any: (graining, marbleizing, polychromy ect.).

Chromochronology		Comments
Substrate: wood		Na_2S
1. Red		DMF
2. White	+	DMF
3. Yellow	+	DMF
4. —		
5. white		DMF
6. white		DMF
7. white		DMF
8. white - ropy		DMF
9. yellow - ropie		DMF
10. —		
11. white	+	CH_2Cl_2
12. white	+	CH_2Cl_2
13. Bright white		CH_2Cl_2
14.		
15.		

Chromochronology	Comments
16.	
17.	
18.	
19.	
20.	
21.	
22.	
23.	
24.	
25.	
26.	
27.	
28.	
29.	
30.	

Summary:

Phase II: Analysis and Recommendations 3-m P
Structure
Location of Sample
Date Removed Removed By

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis

No. of Layers to be Studied #1
Reason for Layer Selection:
Visual Characteristics of Layer to be Matched: (relative thinness, thickness glassiness, ropiness, ect.):

MEDIUM ANALYSIS: (Separate paint/finishlayer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil	DMF	+ softened
Latex		
Whitewash/calcimine		
Waterbased/distemper		
Varnish		
Shellac		

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes___ no ✓, Color
Probable pigment associated with flourescence:

	Possible Pigment Type	Spot Test	Reaction
#1	Iron oxide	$K_4Fe(CN)_6$	yellow → blue
	lead oxide	$KI + H_2O$	–
#2	lead oxide	Na_2S	black
	" "	KI	yellow

PIGMENT AND MEDIUM TYPE: #1 layer

Probable pigment(s): Iron oxide
Probable medium: linseed oil

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if approprate.)

Butens paint color ______ Sherwin-Williams Rookwood Red (Moss) #1 layer 94325

RECOMMENDATIONS

Color:
Paint Type:

DOCUMENTATION
Sample/slide NO: 3-m-P
Report prepared - Date: 3/23 By Whom: MH

Phase I: Sequence of Layers 4-m-P
Structure Monastery
Location of Sample Exterior SE wall main bldg. W corner on top of stucco
Date Removed ____________ Removed By ____________
Significant Facts Regarding The Structure's History Which May Pertain The To The Analysis (dateconstructed, significant alterations, dates painted)

DATA: Microscopic Analysis

CODES		Reaction of	
-Finish	(F)	Sodium Sulfide	(Na_2S)
Primer	(P)	Hydrochloric Acid	(HCI)
Glaze	(G)	Dimethylformamide	(DMF)
Varnish	(V)	Methylene Chloride	(CH_2CL_2)
Shellac	(S)	Water	(H_2O)
Wall paper	(W)	Alcohol	(OH)
Fracture	( )	Turentine	(TURP)
Dirt Layer	(-)	Near UV Light	(UV)

Note layers of decorative painting, if any: (graining, marbleizing, polychromy ect.).

Chromochronology	Comments	Chromochronology	Comments
Substrate: Stucco			
1. White	DMF HCl gone	16.	
2. Yellow Na_2S	DMF	17.	
3. Cream-tan	DMF	18.	
4. Blue	DMF	19.	
5. White		20.	
6. Yellow		21.	
7. White Y/		22.	
8.		23.	
9.		24.	
10.		25.	
11.		26.	
12.		27.	
13.		28.	
14.		29.	
15.		30.	

Summary:

Phase II: Analysis and Recommendations 4-m-P

Structure ________

Location of Sample ________

Date Removed ________ Removed By ________

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis #1 & 2

No. of Layers to be Studied ________

Reason for Layer Selection: ________

Visual Characteristics of Layer to be Matched: (relative thinness, thickness glassiness, ropiness, ect.): ________

MEDIUM ANALYSIS: (Separate paint/finishlayer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil	DMF	dissolved
Latex		
Whitewash/calcimine		
Waterbased/distemper		
Varnish		
Shellac		

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes ___ no ✓. Color ________

Probable pigment associated with flourescence: ________

Possible Pigment Type	Spot Test	Reaction
#1 whiting	dissolves in HCl	
#2 yellow containing lead	Na_2S	Black
chrom yellow	Silver nitrate	Red color

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): #1 whiting in linseed oil

Probable medium: #2 chrome yellow in linseed oil

COLOR: (~~Match sample to color standards; place under UV light for bleaching purposes if approprate.~~)

Butens paint color Eugenie 6th 21/W Sherwin-Williams ________
needs more yellow

RECOMMENDATIONS

Color: ________

Paint Type: ________

DOCUMENTATION

Sample/slide NO: ________

Report prepared - Date: ________ By Whom: ________

Phase I: Sequence of Layers
Structure S-M-P Monast.
Location of Sample Monastic 5 exterior NW Wall kitchen wing W corner
Date Removed April 1988 Removed By MV
Significant Facts Regarding The Structure's History Which May Pertain The To The Analysis (dateconstructed, significant alterations, dates painted)

DATA: Microscopic Analysis

CODES		Reaction of	
-Finish	(F)	Sodium Sulfide	(Na_2S)
Primer	(P)	Hydrochloric Acid	(HCI)
Glaze	(G)	Dimethylformamide	(DMF)
Varnish	(V)	Methylene Chloride	(CH_2CL_2)
Shellac	(S)	Water	(H_2O)
Wall paper	(W)	Alcohol	(OH)
Fracture	( )	Turentine	(TURP)
Dirt Layer	(-)	Near UV Light	(UV)

Note layers of decorative painting, if any: (graining, marbleizing, polychromy ect.).

	Chromochronology	Comments HCl	Comments Na_2S
Substrate:	mortar	HCl	Na_2S
1.	Thick white	+	NR
2.	—		
3.	white		
4.	—		
5.	white		
6.	—		
7.	white		
8.	—		
9.	trans white		
10.	white		
11.	trans white		
12.	white		
13.	—		
14.	white		
15.	—		

	Chromochronology	Comments HCl	Comments Na_2S
16.	Thick white		
17.	—		
18.	white		
19.	—		
20.	white		
21.	white		
22.	white		
23.	white		
24.	white		
25.	white		
26.	orange		
27.			
28.			
29.			
30.			

Summary:

Phase II: Analysis and Recommendations
Structure Dowdusty
Location of Sample 5-m-12
Date Removed ______ Removed By ______

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis ______

No. of Layers to be Studied ______
Reason for Layer Selection: ______
Visual Characteristics of Layer to be Matched: (relative thinness, thickness glassiness, ropiness, ect.): ______

MEDIUM ANALYSIS: (Separate paint/finishlayer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil		
Latex		
Whitewash/calcimine	HCl	+
Waterbased/distemper		
Varnish		
Shellac		

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes ___ no ✓, Color ______
Probable pigment associated with flourescence: ______

Possible Pigment Type	Spot Test	Reaction
Whiting		

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): Whiting
Probable medium: Whitewash

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if approprate.)

Butens paint color ______ Sherwin-Williams ______

RECOMMENDATIONS

Color: ______
Paint Type: ______

DOCUMENTATION
Sample/slide NO: ______
Report prepared - Date: ______ By Whom: ______

Phase I: Sequence of Layers 6-m-p
Structure Monastery
Location of Sample N.W. wall Kitchen wing, west corner
Date Removed ______ Removed By G
Significant Facts Regarding The Structure's History Which May Pertain To The Analysis (dateconstructed, significant alterations, dates painted)

DATA: Microscopic Analysis

CODES		Reaction of	
-Finish	(F)	Sodium Sulfide	(Na_2S)
Primer	(P)	Hydrochloric Acid	(HCI)
Glaze	(G)	Dimethylformamide	(DMF)
Varnish	(V)	Methylene Chloride	(CH_2CL_2)
Shellac	(S)	Water	(H_2O)
Wall paper	(W)	Alcohol	(OH)
Fracture	( )	Turentine	(TURP)
Dirt Layer	(-)	Near UV Light	(UV)

Note layers of decorative painting, if any: (graining, marbleizing, polychromy ect.). white wash

Chromochronology	Comments
Substrate: Monastery	
1. white wash	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	
11.	
12.	
13.	
14.	
15.	

Chromochronology	Comments
16.	
17.	
18.	
19.	
20.	
21.	
22. white wash	
23.	
24.	
25.	
26.	
27.	
28.	
29.	
30.	

Summary:
22 layers of white wash

Phase II: Analysis and Recommendations 6-m-p
Structure ______
Location of Sample ______
Date Removed ______ Removed By ______

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis ______

No. of Layers to be Studied ______
Reason for Layer Selection: ______
Visual Characteristics of Layer to be Matched: (relative thinness, thickness glassiness, ropiness, ect.): ______

MEDIUM ANALYSIS: (Separate paint/finishlayer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil		
Latex		
Whitewash/calcimine	HCl	r
Waterbased/distemper		
Varnish		
Shellac		

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes ___ no ✓. Color ______
Probable pigment associated with flourescence: ______

Possible Pigment Type	Spot Test	Reaction
whiting	HCl	+

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): Whiting (Lime)
Probable medium: white wash

COLOR: (Match sample to color standards; place under UV light for bleacning purposes if approprate.)

Butens paint color — Sherwin-Williams —

RECOMMENDATIONS

Color: ______
Paint Type: ______

DOCUMENTATION
Sample/slide NO: ______
Report prepared - Date: ______ By Whom: ______

Phase I: Sequence of Layers 7-m-P
Structure Monticello
Location of Sample Exterior SE Wall West corner. Paint on ribbon pointing
Date Removed ______ Removed By ______
Significant Facts Regarding The Structure's History Which May Pertain The To The Analysis (dateconstructed, significant alterations, dates painted)

DATA: Microscopic Analysis

CODES		Reaction of	
-Finish	(F)	Sodium Sulfide	(Na_2S)
Primer	(P)	Hydrochloric Acid	(HCl)
Glaze	(G)	Dimethylformamide	(DMF)
Varnish	(V)	Methylene Chloride	(CH_2CL_2)
Shellac	(S)	Water	(H_2O)
Wall paper	(W)	Alcohol	(OH)
Fracture	( )	Turentine	(TURP)
Dirt Layer	(-)	Near UV Light	(UV)

Note layers of decorative painting, if any: (graining, marbleizing, polychromy ect.).

	Chromochronology	Comments		Chromochronology	Comments
Substrate:	mortar				
1.	white	HCl	16.		
2.			17.		
3.			18.		
4.			19.		
5.			20.		
6.			21.		
7.			22.		
8.			23.		
9.			24.		
10.			25.		
11.			26.		
12.			27.		
13.			28.		
14.			29.		
15.			30.		

Summary:
layer of whitewash or calcimine over mortar

Phase II: Analysis and Recommendations 7-M-P
Structure ______
Location of Sample ______
Date Removed ______ Removed By ______

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis ______

No. of Layers to be Studied ______
Reason for Layer Selection: ______
Visual Characteristics of Layer to be Matched: (relative thinness, thickness glassiness, ropiness, ect.): ______

MEDIUM ANALYSIS: (Separate paint/finishlayer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil		
Latex		
Whitewash/calcimine		
Waterbased/distemper		
Varnish		
Shellac		

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes___no___, Color ______
Probable pigment associated with flourescence: ______

Possible Pigment Type	Spot Test	Reaction

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): ______
Probable medium: ______

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if approprate.)

Butens paint color ______ Sherwin-Williams ______

RECOMMENDATIONS

Color: ______
Paint Type: ______

DOCUMENTATION
Sample/slide NO: ______
Report prepared - Date: ______ By Whom: ______

Phase I: Sequence of Layers 8-m-P
Structure Monash's
Location of Sample Kitchen wing interior NW wall first paint layer
Date Removed April '85 Removed By MV
Significant Facts Regarding The Structure's History Which May Pertain The To The Analysis (dateconstructed, significant alterations, dates painted)
Kitchen wing add c 1800 layer of plaster & paint found under present layer

DATA: Microscopic Analysis

CODES		Reaction of	
-Finish	(F)	Sodium Sulfide	(Na_2S)
Primer	(P)	Hydrochloric Acid	(HCl)
Glaze	(G)	Dimethylformamide	(DMF)
Varnish	(V)	Methylene Chloride	(CH_2CL_2)
Shellac	(S)	Water	(H_2O)
Wall paper	(W)	Alcohol	(OH)
Fracture	( )	Turentine	(TURP)
Dirt Layer	(-)	Near UV Light	(UV)

Note layers of decorative painting, if any: (graining, marbleizing, polychromy ect.).

	Chromochronology	Comments
Substrate:	Mortar	
1.	Plaster/lime	
2.	very thin layer of Red	HCL
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		
11.		
12.		
13.		
14.		
15.		

	Chromochronology	Comments
16.		
17.		
18.		
19.		
20.		
21.		
22.		
23.		
24.		
25.		
26.		
27.		
28.		
29.		
30.		

Summary:

Phase II: Analysis and Recommendations 4-m-?
Structure
Location of Sample
Date Removed Removed By

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis to determine 1st layer

No. of Layers to be Studied
Reason for Layer Selection:
Visual Characteristics of Layer to be Matched: (relative thinness, thickness glassiness, ropiness, ect.):

MEDIUM ANALYSIS: (Separate paint/finishlayer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil		
Latex		
Whitewash/calcimine	HCl	+
Waterbased/distemper		
Varnish		
Shellac		

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes___ no___, Color
Probable pigment associated with flourescence:

Possible Pigment Type	Spot Test	Reaction
Iron oxide		Blue color change
Red lead	NaS	

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): Iron oxide
Probable medium: white wash

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if approprate.)

Butens paint color Iron oxide red Sherwin-Williams

RECOMMENDATIONS

Color: Iron oxide in lime wash
Paint Type:

DOCUMENTATION
Sample/slide NO:
Report prepared - Date: J1 19 By Whom: MV

Phase I: Sequence of Layers 9-m-P
Structure Monashuy
Location of Sample Interior NE Wall Kitchen wing fireplace mantle
Date Removed ________ Removed By ________
Significant Facts Regarding The Structure's History Which May Pertain The To The Analysis (dateconstructed, significant alterations, dates painted)

DATA: Microscopic Analysis

CODES		Reaction of	
-Finish	(F)	Sodium Sulfide	(Na_2S)
Primer	(P)	Hydrochloric Acid	(HCI)
Glaze	(G)	Dimethylformamide	(DMF)
Varnish	(V)	Methylene Chloride	(CH_2CL_2)
Shellac	(S)	Water	(H_2O)
Wall paper	(W)	Alcohol	(OH)
Fracture	( )	Turentine	(TURP)
Dirt Layer	(-)	Near UV Light	(UV)

Note layers of decorative painting, if any: (graining, marbleizing, polychromy ect.).

Chromochronology	Comments	Chromochronology	Comments
Substrate: Wood			
1. Red	Na_2S	16. white	
2. Black glaze	- soot	17. white	
3. yellow white	Na_2S	18. —	
4. Brownish yellow white	?	19. yellow white	
5. —		20. black glaze	
6. white	Na_2S	21. yellow cream	
7. Brown	?	22. Rose pink	
8. —		23. green Lt.	
9. yellow white brown	?	24. Lt. green	
10. —		25. Lt green	
11. Brown yellow Brown	?	26. cream	
12. —		27. cream	
13. white	Na_2S	28. white	
14. —		29.	
15. white		30.	

Summary: ? = color too dark to tell

Phase II: Analysis and Recommendations 9-m-P
Structure
Location of Sample
Date Removed Removed By

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis #1

No. of Layers to be Studied
Reason for Layer Selection:
Visual Characteristics of Layer to be Matched: (relative thinness, thickness glassiness, ropiness, ect.):

MEDIUM ANALYSIS: (Separate paint/finishlayer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil	DMF	dissolved
Latex		
Whitewash/calcimine		
Waterbased/distemper		
Varnish		
Shellac		

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes___no___, Color
Probable pigment associated with flourescence:

Possible Pigment Type	Spot Test	Reaction
Iron oxide	K Fe	Blue Color

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): Iron oxide
Probable medium: linseed oil

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if approprate.) moss

Butens paint color Sherwin-Williams Bookwood Red 94325

RECOMMENDATIONS

Color:
Paint Type:

DOCUMENTATION
Sample/slide NO: 9-m-P
Report prepared - Date: 7/24 By Whom: mV

Phase I: Sequence of Layers 10-m-P
Structure Monastery
Location of Sample Interior NE Wall Paint above fireplace mantle
Date Removed April 1988 Removed By
Significant Facts Regarding The Structure's History Which May Pertain The To The Analysis (dateconstructed, significant alterations, dates painted)

DATA: Microscopic Analysis

CODES		Reaction of	
-Finish	(F)	Sodium Sulfide	(Na_2S)
Primer	(P)	Hydrochloric Acid	(HCl)
Glaze	(G)	Dimethylformamide	(DMF)
Varnish	(V)	Methylene Chloride	(CH_2CL_2)
Shellac	(S)	Water	(H_2O)
Wall paper	(W)	Alcohol	(OH)
Fracture	( )	Turentine	(TURP)
Dirt Layer	(-)	Near UV Light	(UV)

Note layers of decorative painting, if any: (graining, marbleizing, polychromy ect.).

Substrate: Plaster

	Chromochronology	Comments		Chromochronology	Comments
1.	white		16.	Cream	Na_2S
2.	—		17.	—	
3.	Brownish white		18.	cream yellow	Na_2S slight
4.	—		19.	cream yellow	Na_2S slight
5.	Brown white		20.	—	
6.	Brown white		21.	Thin Cream	
7.	Brown white		22.	Green	
8.	—		23.	thin cream	
9.	Brown white		24.	yellow	DMF
10.	Brown white		25.	cream	
11.	—		26.	cream	
12.	Brown white		27.	yellow	
13.	yellow white	Na_2S	28.	yellow	
14.	yellow cream	Na_2S	29.	cream	
15.	—		30.		

Summary:

Phase II: Analysis and Recommendations 10 - m - 2
Structure ______
Location of Sample ______
Date Removed ______ Removed By ______

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis ______

No. of Layers to be Studied #1
Reason for Layer Selection: ______
Visual Characteristics of Layer to be Matched: (relative thinness, thickness glassiness, ropiness, ect.): ______

MEDIUM ANALYSIS: (Separate paint/finishlayer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil	DMF	−
Latex		
Whitewash/calcimine	HCL	+
Waterbased/distemper		
Varnish		
Shellac		

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes___ no___, Color ______
Probable pigment associated with flourescence: ______

Possible Pigment Type	Spot Test	Reaction
	H_2SO_4	long needles

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): ______
Probable medium: calcimine

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if approprate.)

Butens paint color —unable to match color / because of Dark Smoke Sherwin-Williams ______

RECOMMENDATIONS

Color: ______
Paint Type: white wash

DOCUMENTATION
Sample/slide NO: ______
Report prepared - Date: ______ By Whom: ______

Phase I: Sequence of Layers 11-m-P
Structure Monastery
Location of Sample Interior whitewash from kitchen beams
Date Removed April 1988 Removed By MVS
Significant Facts Regarding The Structure's History Which May Pertain The To The Analysis (dateconstructed, significant alterations, dates painted)

DATA: Microscopic Analysis

CODES		Reaction of	
-Finish	(F)	Sodium Sulfide	(Na_2S)
Primer	(P)	Hydrochloric Acid	(HCl)
Glaze	(G)	Dimethylformamide	(DMF)
Varnish	(V)	Methylene Chloride	(CH_2CL_2)
Shellac	(S)	Water	(H_2O)
Wall paper	(W)	Alcohol	(OH)
Fracture	( )	Turentine	(TURP)
Dirt Layer	(-)	Near UV Light	(UV)

Note layers of decorative painting, if any: (graining, marbleizing, polychromy ect.).

Chromochronology	Comments	Chromochronology	Comments
Substrate: Plaster			
1. Yellow white		16. white	
2. white		17. —	
3. white		18. white	
4. —		19. white	
5. white		20. —	
6. white thin		21. Porous thick white	
7. white		22. " " "	
8. —		23. Thin white	
9. white thick porous		24. Bright white	
10. white thick porous		25. Bright white	
11. Bright white ropey thick		26.	
12. —		27.	
13. Yellow white		28.	
14. white		29.	
15. yellow white		30.	

Summary: No reaction w/ Na_2S No lead
reacted w/ HNO_3

Phase II: Analysis and Recommendations 11-m-P
Structure ____________
Location of Sample ____________
Date Removed ____________ Removed By ____________

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis ____________

No. of Layers to be Studied ____________
Reason for Layer Selection: ____________
Visual Characteristics of Layer to be Matched: (relative thinness, thickness glassiness, ropiness, ect.): ____________

MEDIUM ANALYSIS: (Separate paint/finishlayer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil	DMF	—
Latex		
Whitewash/calcimine	HNO_3	+
Waterbased/distemper		
Varnish		
Shellac		

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes ____ no ✓ Color ____________
Probable pigment associated with flourescence: ____________

Possible Pigment Type	Spot Test	Reaction
Whiting	HCl	revolution of gas

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): ____________
Probable medium: whitewash

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if approprate.)

Butens paint color ____________ Sherwin-Williams ____________

RECOMMENDATIONS

Color: ____________
Paint Type: ____________

DOCUMENTATION
Sample/slide NO: 11-m-F
Report prepared - Date: 3/ 23 By Whom: m / ''

Phase I: Sequence of Layers 12-m-p
Structure Monastery
Location of Sample Interior NW Wall Kitchen wing, whitewash over 11-m-m
Date Removed ____ Removed By ____
Significant Facts Regarding The Structure's History Which May Pertain The To The Analysis (dateconstructed, significant alterations, dates painted)

DATA: Microscopic Analysis

CODES		Reaction of	
-Finish	(F)	Sodium Sulfide	(Na_2S)
Primer	(P)	Hydrochloric Acid	(HCI)
Glaze	(G)	Dimethylformamide	(DMF)
Varnish	(V)	Methylene Chloride	(CH_2CL_2)
Shellac	(S)	Water	(H_2O)
Wall paper	(W)	Alcohol	(OH)
Fracture	( )	Turentine	(TURP)
Dirt Layer	(-)	Near UV Light	(UV)

Note layers of decorative painting, if any: (graining, marbleizing, polychromy ect.).

Substrate: Plaster

	Chromochronology	Comments		Chromochronology	Comments
1.	white	HCl	16.	translucent white	HCl
2.	white		17.	white	
3.	white		18.	—	
4.	white		19.	white	
5.	white		20.	white	
6.	—		21.	white	
7.	w		22.	bright white	
8.	white		23.	—	
9.	white		24.	white	
10.	white		25.	white	
11.	—		26.	—	
12.	white		27.	bright white	
13.	white		28.	thick white	
14.	~~[illegible]~~ yellow white		29.	white	
15.	white		30.	white	
				white	

Summary:
No reaction w/ Na_2S Sample contaminated w/ Fe from mortar

Phase II: Analysis and Recommendations 12-M-7
Structure Monastery
Location of Sample
Date Removed Removed By

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis

No. of Layers to be Studied
Reason for Layer Selection:
Visual Characteristics of Layer to be Matched: (relative thinness, thickness glassiness, ropiness, ect.):

MEDIUM ANALYSIS: (Separete paint/finishleyer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil		
Latex		
Whitewash/calcimine	✓ HCl	+
Waterbased/distemper		
Varnish		
Shellac		

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes___no___, Color test for zinc ox.
Probable pigment associated with flourescence:

Possible Pigment Type	Spot Test	Reaction
Whiting	HCl	+

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): Whitewash with whiting
Probable medium:

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if approprate.)

Butens paint color Sherwin-Williams

RECOMMENDATIONS

Color:
Paint Type:

DOCUMENTATION
Sample/slide NO:
Report prepared - Date: By Whom:

Phase I: Sequence of Layers 13-m-P
Structure Monastery
Location of Sample Interior NE Wall kitchen wing off door to loft
Date Removed April 1988 Removed By MJ
Significant Facts Regarding The Structure's History Which May Pertain The To The Analysis (dateconstructed, significant alterations, dates painted)

DATA: Microscopic Analysis

CODES		Reaction of	
-Finish	(F)	Sodium Sulfide	(Na_2S)
Primer	(P)	Hydrochloric Acid	(HCl)
Glaze	(G)	Dimethylformamide	(DMF)
Varnish	(V)	Methylene Chloride	(CH_2CL_2)
Shellac	(S)	Water	(H_2O)
Wall paper	(W)	Alcohol	(OH)
Fracture	( )	Turentine	(TURP)
Dirt Layer	(-)	Near UV Light	(UV)

Note layers of decorative painting, if any: (graining, marbleizing, polychromy ect.).

	Chromochronology	Comments		Chromochronology	Comments
Substrate:	wood		16.	—	
1.	Red		17.	white	DMF
2.	Yellow		18.		
3.	cream		19.		
4.	~~E~~ G		20.		
5.	white		21.		
6.	G		22.		
7.	bright white		23.		
8.	cream		24.		
9.	yellow copy		25.		
10.	white		26.		
11.	G		27.		
12.	yellow		28.		
13.	thin ~~green~~ yellow green		29.		
14.	green	DMF	30.		
15.	blue	DMF			

Summary:

Phase II: Analysis and Recommendations 13-M-8
Structure
Location of Sample
Date Removed Removed By

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis

No. of Layers to be Studied
Reason for Layer Selection:
Visual Characteristics of Layer to be Matched: (relative thinness, thickness glassiness, ropiness, ect.):

MEDIUM ANALYSIS: (Separate paint/finishlayer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil	DMF	Softens
Latex		
Whitewash/calcimine		
Waterbased/distemper		
Varnish		
Shellac		

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes ___ no ✓, Color
Probable pigment associated with flourescence:

Possible Pigment Type	Spot Test	Reaction
#1 Iron oxide	Potassium Ferrocyanide	Blue pH
#2 lead	"	yellow

PIGMENT AND MEDIUM TYPE:

Probable pigment(s):
Probable medium:

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if approprate.)

Butens paint color White very bright but yellowed No match Sherwin-Williams Rookwood Red

RECOMMENDATIONS

Color:
Paint Type:

DOCUMENTATION
Sample/slide NO:
Report prepared - Date: By Whom:

Phase I: Sequence of Layers 14-m-P

Structure Monastery

Location of Sample Interior, NW wall, kitchen wing, center 4 ft above floor

Date Removed April 1988 Removed By MVZ

Significant Facts Regarding The Structure's History Which May Pertain The To The Analysis (dateconstructed, significant alterations, dates painted)

addition to main building c1880

DATA: Microscopic Analysis

CODES		Reaction of	
-Finish	(F)	Sodium Sulfide	(Na_2S)
Primer	(P)	Hydrochloric Acid	(HCI)
Glaze	(G)	Dimethylformamide	(DMF)
Varnish	(V)	Methylene Chloride	(CH_2CL_2)
Shellac	(S)	Water	(H_2O)
Wall paper	(W)	Alcohol	(OH)
Fracture	( )	Turentine	(TURP)
Dirt Layer	(-)	Near UV Light	(UV)

Note layers of decorative painting, if any: (graining, marbleizing, polychromy ect.). First layers transparent Brown

Substrate: Plaster

Chromochronology	Comments		Chromochronology	Comments
1. Brown Yellow 6			16. Tan	Na_2S
2. Translucent Lt Green	Na_2S HCl		17. Black line	
3. Black line			18. Yellow	Na_2S
4. Translucent Lt green	HCl		19. Black line	
5. Dark line			20. Yellow	Lt, Na_2S DMF
6. Translucent Brown	HCl		21. Black line	
7. Tan			22. Green	DMF
8. Black line	Na_2S		23. Black line	
9. Lt Green	Na_2S		24. Yellow	DMF
10. Black line			25. White	Lt
11. Tan	Na_2S		26. White	"
12. Black line			27. Cream	Na_2S DMF
13. Yellow white	Na_2S		28. Cream	Na_2S "
14. Tan	Na_2S		29. White	DMF
15. Black line			30.	

Summary:

Phase II: Analysis and Recommendations 14-m-p
Structure ____________
Location of Sample ____________
Date Removed ____________ Removed By ____________

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis ____________

No. of Layers to be Studied Layer # 1, 2
Reason for Layer Selection: ____________
Visual Characteristics of Layer to be Matched: (relative thinness, thickness glassiness, ropiness, ect.): Thick ropiness

MEDIUM ANALYSIS: (Separate paint/finishlayer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil	Dmf	+ +
Latex		
Whitewash/calcimine	HCl	+
Waterbased distemper		
Varnish		
Shellac		

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes ___ no ✓. Color ____________
Probable pigment associated with flourescence: ____________

Possible Pigment Type	Spot Test	Reaction
Calcimine	H_2SO_4	+

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): Calcimin
Probable medium: Linseed oil

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if approprate.)

Butens paint color ____________ Sherwin-Williams ____________

RECOMMENDATIONS

Color: White Lime.
Paint Type: Linseed oil

DOCUMENTATION
Sample/slide NO: ____________
Report prepared - Date: ________ By Whom: ____________

Phase I: Sequence of Layers 15-m-P
Structure Monastery
Location of Sample Interior S.W. wall / Kitchen wing Door Jam to Entry
Date Removed April 1988 Removed By M.K.J.
Significant Facts Regarding The Structure's History Which May Pertain The To The Analysis (dateconstructed, significant alterations, dates painted)
Door way 18^{th} century molding

DATA: Microscopic Analysis

CODES			Reaction of	
-Finish	(F)		Sodium Sulfide	(Na_2S)
Primer	(P)		Hydrochloric Acid	(HCl)
Glaze	(G)		Dimethylformamide	(DMF)
Varnish	(V)		Methylene Chloride	(CH_2CL_2)
Shellac	(S)		Water	(H_2O)
Wall paper	(W)		Alcohol	(OH)
Fracture	( )		Turentine	(TURP)
Dirt Layer	(-)		Near UV Light	(UV)

Note layers of decorative painting, if any: (graining, marbleizing, polychromy ect.). 2 layers of graining

Chromochronology	Comments		Chromochronology	Comments
Substrate: wood				
1. red - Thin			16. Yellow cream	UV
2. white	Slight Na_2S		17. -	
3. Glaze -			18. white	Na_2S
4. white yellow	slight Na_2S		19. Brown Glaze	
5. Glaze			20. Yellow cream	
6. white			21. Pink	DMF
7. Glaze			22. Green	
8. white	Na_2S		23. Green	
9. Glaze			24. Green	
10. white			25. white	
11. -			26. Yellow	
12. white	Na_2S		27. white	
13. -			28.	
14. white	Na_2S UV		29.	
15. -			30.	

Summary:

Phase II: Analysis and Recommendations 15-m-P
Structure Monastery
Location of Sample ____________________
Date Removed ____________________ Removed By ____________________

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis Layer 1, 2, 3

No. of Layers to be Studied 1, 2, 3
Reason for Layer Selection: ____________________
Visual Characteristics of Layer to be Matched: (relative thinness, thickness glassiness, ropiness, ect.): Red Very Thick - ropiness, 2nd layer shows Brush mark,

MEDIUM ANALYSIS: (Separate paint/finishlayer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil	DMF	−
Latex		
Whitewash/calcimine	HCl	+
Waterbased/distemper		
Varnish		
Shellac		

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes____ no____, Color ____________________
Probable pigment associated with flourescence: ____________________

Possible Pigment Type	Spot Test	Reaction
Red	Potassium Ferocyanide	+ Blue PPt
White	KI	+

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): *1 Iron Oxide *2 Lead white
Probable medium: *1 Calcimine 2 Calcimine

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if approprate.)

Butens paint color Iron oxide Red Sherwin-Williams ____________________

RECOMMENDATIONS

Color: ____________________
Paint Type: ____________________

DOCUMENTATION
Sample/slide NO: ____________________
Report prepared - Date: __________ By Whom: __________

Phase I: Sequence of Layers 17-m-P
Structure Monastery
Location of Sample Interior N.E wall, Kitchen wing, wall in loft over stairs
Date Removed ______ Removed By ______
Significant Facts Regarding The Structure's History Which May Pertain The To The Analysis (dateconstructed, significant alterations, dates painted)

DATA: Microscopic Analysis

CODES		Reaction of	
-Finish	(F)	Sodium Sulfide	(Na_2S)
Primer	(P)	Hydrochloric Acid	(HCI)
Glaze	(G)	Dimethylformamide	(DMF)
Varnish	(V)	Methylene Chloride	(CH_2CL_2)
Shellac	(S)	Water	(H_2O)
Wall paper	(W)	Alcohol	(OH)
Fracture	( )	Turentine	(TURP)
Dirt Layer	(-)	Near UV Light	(UV)

Note layers of decorative painting, if any: (graining, marbleizing, polychromy ect.).

	Chromochronology	Comments
Substrate:	Plaster	HCl
1.	Pink	+
2.	white	+
3.	white	+
4.	white	+
5.	white	+
6.	—	
7.	white	+
8.	white	+
9.	white	+
10.	white	+
11.	white	+
12.	white	+
13.	—	
14.	white	+
15.	orange	+

	Chromochronology	Comments	
		HCl	
16.	red	+	
17.	white	+	
18.	Yellow		DMF
19.			
20.			
21.			
22.			
23.			
24.			
25.			
26.			
27.			
28.			
29.			
30.			

Summary:

Phase II: Analysis and Recommendations 17-M-P
Structure __________
Location of Sample __________
Date Removed __________ Removed By __________

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis __________

No. of Layers to be Studied ✱ 1
Reason for Layer Selection: __________
Visual Characteristics of Layer to be Matched: (relative thinness, thickness glassiness, ropiness, ect.): __________

MEDIUM ANALYSIS: (Separate paint/finishlayer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil	DMF	−
Latex		
Whitewash/calcimine	HNO_3	+ H_2SO_4 crystals
Waterbased/distemper		
Varnish		
Shellac		

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes __ no ✓, Color __________
Probable pigment associated with flourescence: __________

Possible Pigment Type	Spot Test	Reaction
Lead Red	KI	−
Lake Pigment	H_2SO_4	−
Iron Oxide	HCl + Potassium Ferrocyanide	+

PIGMENT AND MEDIUM TYPE: Sample found contaminated w/ Iron

Probable pigment(s): Iron oxide
Probable medium: calcimine

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if appropriate.)

Butens paint color Between Rasberry Cream and Pink Grottes Sherwin-Williams __________

RECOMMENDATIONS

Color: __________
Paint Type: __________

DOCUMENTATION
Sample/slide NO: __________
Report prepared - Date: __________ By Whom: __________

Phase I: Sequence of Layers 18-m-P
Structure Monastery
Location of Sample Interior, N.W. wall/main building/music Room/west corner wall
Date Removed ________ Removed By ________
Significant Facts Regarding The Structure's History Which May Pertain The To The Analysis (dateconstructed, significant alterations, dates painted)

DATA: Microscopic Analysis

CODES		Reaction of	
-Finish	(F)	Sodium Sulfide	(Na_2S)
Primer	(P)	Hydrochloric Acid	(HCl)
Glaze	(G)	Dimethylformamide	(DMF)
Varnish	(V)	Methylene Chloride	(CH_2CL_2)
Shellac	(S)	Water	(H_2O)
Wall paper	(W)	Alcohol	(OH)
Fracture	( )	Turentine	(TURP)
Dirt Layer	(-)	Near UV Light	(UV)

Note layers of decorative painting, if any: (graining, marbleizing, polychromy ect.).

	Chromochronology	Comments
Substrate:	Plaster	
1.	Glaze	
2.	Yellow white	Na_2S
3.	Pink	Na_2S
4.	Pink	
5.	Thick Translucent gray	
6.	Thin Bright Red	
7.	Thick Translucent	
8.	Bright yellow	
9.	Thin white	
10.	Lt Blue	Na_2S
11.	Cream white	Na_2S
12.	-	
13.	Cream	DMF/CH_2Cl_2
14.	Cream	DMF/CH_2Cl_2
15.		

	Chromochronology	Comments
16.		
17.		
18.		
19.		
20.		
21.		
22.		
23.		
24.		
25.		
26.		
27.		
28.		
29.		
30.		

Summary:

Phase II: Analysis and Recommendations 18-m-P
Structure Monastery
Location of Sample —
Date Removed April 1988 Removed By MVJ

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis * 1, 2

No. of Layers to be Studied
Reason for Layer Selection:
Visual Characteristics of Layer to be Matched: (relative thinness, thickness glassiness, ropiness, ect.):

MEDIUM ANALYSIS: (Separate paint/finishlayer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil	#1,2 DMF	Softened
Latex		
Whitewash/calcimine		
Waterbased/distemper		
Varnish		
Shellac		

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes___ no ✓, Color
Probable pigment associated with flourescence:

Possible Pigment Type	Spot Test	Reaction
*1 Lead white	KI	yellow ppt
*2 Iron oxide	HCl + $K_4Fe(CN)_6$	Blue PPT

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): See above
Probable medium: Linseed oil

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if approprate.)

Butens paint color *1 Patina *2 Bitter sweet Pink Sherwin-Williams
needs more orange.

RECOMMENDATIONS

Color:
Paint Type:

DOCUMENTATION
Sample slide NO:
Report prepared - Date: By Whom:

Phase I: Sequence of Layers 17-m-P
Structure Monastery
Location of Sample Interior molding /music Room/N.W. wall
Date Removed April 1988 Removed By M.V.D.
Significant Facts Regarding The Structure's History Which May Pertain The To The Analysis (dateconstructed, significant alterations, dates painted)

DATA: Microscopic Analysis

CODES		Reaction of	
-Finish	(F)	Sodium Sulfide	(Na_2S)
Primer	(P)	Hydrochloric Acid	(HCI)
Glaze	(G)	Dimethylformamide	(DMF)
Varnish	(V)	Methylene Chloride	(CH_2CL_2)
Shellac	(S)	Water	(H_2O)
Wall paper	(W)	Alcohol	(OH)
Fracture	( )	Turentine	(TURP)
Dirt Layer	(-)	Near UV Light	(UV)

Note layers of decorative painting, if any: (graining, marbleizing, polychromy ect.).

Substrate: Wood

	Chromochronology	Comments
1.	Red	Na_2S
2.	Blue	
3.	—	
4.	Dark Green	Na_2S
5.	—	
6.	Yellow white	Na_2S
7.	tan white	
8.	—	
9.	Yellow white	Na_2S
10.	white	Na_2S
11.	Yellow white	
12.	—	
13.	white	
14.	white	
15.		

	Chromochronology	Comments
16.		
17.		
18.		
19.		
20.		
21.		
22.		
23.		
24.		
25.		
26.		
27.		
28.		
29.		
30.		

Summary:
*1&2 red with translucent Blue Layer over

Phase II: Analysis and Recommendations 19-m-P
Structure Monastery
Location of Sample Band
Date Removed April 1988 Removed By MVO

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis #1, #2

No. of Layers to be Studied
Reason for Layer Selection:
Visual Characteristics of Layer to be Matched: (relative thinness, thickness glassiness, ropiness, ect.):

MEDIUM ANALYSIS: (Separate paint/finishlayer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil	DMF	–
Latex		
Whitewash/calcimine	HCl	+
Waterbased/distemper		
Varnish		
Shellac		

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes___ no ✓, Color
Probable pigment associated with flourescence:

Possible Pigment Type	Spot Test	Reaction
#1 Red lead	KI	yellow PH
Iron	$K_4Fe(CN)_6$	Blue
#2 Blue ultramarine	HNO_3	color change

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): Lead oxide + Iron oxide
Probable medium: Linseed oil

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if approprate.)

Butens paint color — Sherwin-Williams —

RECOMMENDATIONS

~~Color~~: Red - Iron oxide + lead in whitewash calcimine
~~Paint Type~~: Blue : ultramarine in calcimine

DOCUMENTATION
Sample/slide NO:
Report prepared - Date: By Whom:

Phase I: Sequence of Layers 20-m-P
Structure Monalvey
Location of Sample Interior S W wall music room 2nd paint layer
Date Removed April 85   Removed By MT
Significant Facts Regarding The Structure's History Which May Pertain The To The Analysis (dateconstructed, significant alterations, dates painted)
Room altered after 1840

DATA: Microscopic Analysis

CODES		Reaction of	
-Finish	(F)	Sodium Sulfide	(Na_2S)
Primer	(P)	Hydrochloric Acid	(HCI)
Glaze	(G)	Dimethylformamide	(DMF)
Varnish	(V)	Methylene Chloride	(CH_2CL_2)
Shellac	(S)	Water	(H_2O)
Wall paper	(W)	Alcohol	(OH)
Fracture	( )	Turentine	(TURP)
Dirt Layer	(-)	Near UV Light	(UV)

Note layers of decorative painting, if any: (graining, marbleizing, polychromy ect.).

	Chromochronology	Comments
Substrate:		
1.	white	
2.	white	
3.	white	
4.	white yellow	
5.	white	
6.	white	
7.	white	
8.	white	
9.	white	
10.	white yellow	
11.	white yellow	
12.	white	
13.	—	
14.	white	
15.	plastic - reversed	

	Chromochronology	Comments
16.		
17.		
18.		
19.		
20.		
21.		
22.		
23.		
24.		
25.		
26.		
27.		
28.		
29.		
30.		

Summary:

Phase II: Analysis and Recommendations 2U - m - P
Structure Mansfield
Location of Sample
Date Removed Removed By

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis

No. of Layers to be Studied
Reason for Layer Selection:
Visual Characteristics of Layer to be Matched: (relative thinness, thickness glassiness, ropiness, ect.):

MEDIUM ANALYSIS: (Separate paint/finishlayer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil	—	
Latex	—	
Whitewash/calcimine	+	
Waterbased/distemper	—	
Varnish	—	
Shellac		
Na₂S	No reaction any layer	

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes ✓ no ____, Color
Probable pigment associated with flourescence:

Possible Pigment Type	Spot Test	Reaction
Zinc Ox	HCl + Potassium Ferrocyanide	Blue color

PIGMENT AND MEDIUM TYPE: too difficult to distinguish layers between lit white & Zinc ox.
Probeble pigment(s): Zinc ox
Probable medium: calcimine

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if approprate.)

Butens paint color Sherwin-Williams

RECOMMENDATIONS

Color:
Paint Type:

DOCUMENTATION
Sample/slide NO:
Report prepared - Date: By Whom:

Phase I: Sequence of Layers 21 m-?
Structure Monastery
Location of Sample music Room Doorway to exterior
Date Removed April 1988 Removed By GVQ
Significant Facts Regarding The Structure's History Which May Pertain The To The Analysis (dateconstructed, significant alterations, dates painted)

1900 Addition

DATA: Microscopic Analysis

CODES -Finish (F)
Primer (P)
Glaze (G)
Varnish (V)
Shellac (S)
Wall paper (W)
Fracture ( )
Dirt Layer (-)

Reaction of Sodium Sulfide (Na_2S)
Hydrochloric Acid (HCI)
Dimethylformamide (DMF)
Methylene Chloride (CH_2CL_2)
Water (H_2O)
Alcohol (OH)
Turentine (TURP)
Near UV Light (UV)

Note layers of decorative painting, if any: (graining, marbleizing, polychromy ect.).

Substrate: wood

	Chromochronology		Comments
1.	Cream		Dmf Na_2S
2.	cream	furry	Dmf Na_2S
3.	cream	Thin	Dmf Na_2S
4.	—		
5.	cream		Dmf YU
6.	white		Dmf
7.	—		
8.	cream		Dmf
9.			
10.			
11.			
12.			
13.			
14.			
15.			

	Chromochronology	Comments
16.		
17.		
18.		
19.		
20.		
21.		
22.		
23.		
24.		
25.		
26.		
27.		
28.		
29.		
30.		

Summary:

Phase II: Analysis and Recommendations 21-m-P
Structure Masonry
Location of Sample
Date Removed April 1988 Removed By mvg

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis

No. of Layers to be Studied
Reason for Layer Selection:
Visual Characteristics of Layer to be Matched: (relative thinness, thickness glassiness, ropiness, ect.):

MEDIUM ANALYSIS: (Separate paint/finishlayer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil		
Latex		
Whitewash/calcimine		
Waterbased/distemper		
Varnish		
Shellac		

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes ___ no ✓, Color
Probable pigment associated with flourescence:

Possible Pigment Type	Spot Test	Reaction
Lead	Na_2S	Turned Black

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): Lead
Probable medium: Oil

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if approprate.)

Butens paint color — Sherwin-Williams —

RECOMMENDATIONS

Color:
Paint Type:

DOCUMENTATION
Sample/slide NO:
Report prepared - Date: By Whom:

Phase 1: Sequence of Layers 22-m-p
Structure Monastery
Location of Sample Interior [illegible] wall music room wall over fireplace
Date Removed ______ Removed By ______
Significant Facts Regarding The Structure's History Which May Pertain The To The Analysis (dateconstructed, significant alterations, dates painted)

DATA: Microscopic Analysis

CODES		Reaction of	
-Finish	(F)	Sodium Sulfide	(Na_2S)
Primer	(P)	Hydrochloric Acid	(HCI)
Glaze	(G)	Dimethylformamide	(DMF)
Varnish	(V)	Methylene Chloride	CH_2CL_2
Shellac	(S)	Water	(H_2O)
Wall paper	(W)	Alcohol	(OH)
Fracture	( )	Turentine	(TURP)
Dirt Layer	(-)	Near UV Light	(UV)

Note layers of decorative painting, if any: (graining, marbleizing, polychromy ect.).

	Chromochronology	Comments
Substrate:	Plaster	
1.	[illegible] yellow white	
2.	yellow white	Na_2S
3.	Red-pink	part of red reacted
4.	—	
5.	trans. gray	—
6.	red line	
7.	yellow	
8.	green	Na_2S
9.	yellow cream	Na_2S
10.	yellow cream	Na_2S
11.	green	
12.	lt. green	
13.		
14.		
15.		

	Chromochronology	Comments
16.		
17.		
18.		
19.		
20.		
21.		
22.		
23.		
24.		
25.		
26.		
27.		
28.		
29.		
30.		

Summary:

Phase II: Analysis and Recommendations See 22-m-8
Structure ____
Location of Sample ____
Date Removed ____ Removed By ____

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis ____

No. of Layers to be Studied ____
Reason for Layer Selection: ____
Visual Characteristics of Layer to be Matched: (relative thinnesa, thickness glassiness, ropiness, ect.): ____

MEDIUM ANALYSIS: (Separate paint/finishlayer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil	DMF	softened
Latex		
Whitewash/calcimine		
Waterbased/distemper		
Varnish		
Shellac		

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes ____ no ____, Color ____
Probable pigment associated with flourescence: ____

	Possible Pigment Type	Spot Test	Reaction
#1,2	lead white	KI	yellow color
	Red	Potassium Thiocyanide	—
	Red	KI	yellow color

PIGMENT AND MEDIUM TYPE:
Probable pigment(s): #1,2 lead white linseed oil
#3 Red lead in linseed oil
Probable medium: #3 [illegible]

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if approprate.)
Butens paint color #1,2 Dreamland (w) #3 bittersweet pink Sherwin-Williams ____
needs more orange

RECOMMENDATIONS

Color: ____
Paint Type: ____

DOCUMENTATION
Sample/slide NO: ____
Report prepared - Date: ____ By Whom: ____

Phase I: Sequence of Layers 23-m-8
Structure Monastery
Location of Sample Interior NE Wall music room just below ceiling center
Date Removed ____ Removed By ____
Significant Facts Regarding The Structure's History Which May Pertain The To The Analysis (dateconstructed, significant alterations, dates painted)
This wall may have been moved.

DATA: Microscopic Analysis

CODES		Reaction of	
-Finish	(F)	Sodium Sulfide	(Na_2S)
Primer	(P)	Hydrochloric Acid	(HCl)
Glaze	(G)	Dimethylformamide	(DMF)
Varnish	(V)	Methylene Chloride	(CH_2CL_2)
Shellac	(S)	Water	(H_2O)
Wall paper	(W)	Alcohol	(OH)
Fracture	( )	Turentine	(TURP)
Dirt Layer	(-)	Near UV Light	(UV)

Note layers of decorative painting, if any: (graining, marbleizing, polychromy ect.).

	Chromochronology		Comments
Substrate:	Plaster		DMF
1.	G		
2.	yellow white		DMF
3.	yellow white	Na_2S	DMF
4.	Red	—	
5.	transparent		DMF fluoresces
6.	transparent		DMF
7.	yellow white	Na_2S	
8.	yellow white	Na_2S	
9.	yellow white	Na_2S	
10.	—		
11.	yellow white		
12.	green		
13.	lt. green		
14.			
15.			

	Chromochronology	Comments
16.		
17.		
18.		
19.		
20.		
21.		
22.		
23.		
24.		
25.		
26.		
27.		
28.		
29.		
30.		

Summary:

Phase I: Sequence of Layers 23-m-8
Structure Monastery
Location of Sample Interior NE Wall music room below ceiling center
Date Removed ______ Removed By ______
Significant Facts Regarding The Structure's History which May Pertain The To The Analysis (dateconstructed, significant alterations, dates painted)
This wall may have been moved.

DATA: Microscopic Analysis

CODES		Reaction of	
Finish	(F)	Sodium Sulfide	(Na_2S)
Primer	(P)	Hydrochloric Acid	(HCI)
Glaze	(G)	Dimethylformamide	(DMF)
Varnish	(V)	Methylene Chloride	(CH_2CL_2)
Shellac	(S)	Water	(H_2O)
Wall paper	(W)	Alcohol	(OH)
Fracture	( )	Turentine	(TURP)
Dirt Layer	(-)	Near UV Light	(UV)

Note layers of decorative painting, if any: (graining, marbleizing, polychromy ect.).

	Chromochronology		Comments
Substrate:	Plaster		DmF
1.	G		
2.	yellow white		DMF
3.	yellow white	Na_2S	DmF
4.	Red	—	
5.	transparent		DMF fluoresces
6.	transparent		DMF
7.	yellow white	Na_2S	
8.	yellow white	Na_2S	
9.	yellow white	Na_2S	
10.	—		
11.	yellow white		
12.	green		
13.	lt. green		
14.			
15.			

	Chromochronology	Comments
16.		
17.		
18.		
19.		
20.		
21.		
22.		
23.		
24.		
25.		
26.		
27.		
28.		
29.		
30.		

Summary:

See 23-m-P

Phase II: Analysis and Recommendations
Structure ____________
Location of Sample ____________
Date Removed ____________ Removed By ____________

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis ____________

No. of Layers to be Studied ____________
Reason for Layer Selection: ____________
Visual Characteristics of Layer to be Matched: (relative thinness, thickness glassiness, ropiness, ect.): ____________

MEDIUM ANALYSIS: (Separate paint/finishlayer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil	DMF	✓
Latex		
Whitewash/calcimine		
Waterbased/distemper		
Varnish		
Shellac		

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes ___ no ✓, Color ____________
Probable pigment associated with flourescence: ____________

	Possible Pigment Type	Spot Test	Reaction
#1	lead white	KI	yellow
	red	KI	yellow [illegible]

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): lead white / linseed oil
Probable medium: red lead linseed oil

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if approprate.)
#1 5th 25 dreamland (w)
Butens paint color #3 bittersweet pink Sherwin-Williams ____________
→ needs more orange

RECOMMENDATIONS

Color: ____________
Paint Type: ____________

DOCUMENTATION
Sample/slide NO: ____________
Report prepared - Date: ________ By Whom: ____________

Phase I: Sequence of Layers 24 - m - P
Structure Monastery
Location of Sample music room door molding
Date Removed April 1988 Removed By MV
Significant Facts Regarding The Structure's History Which May Pertain The To The Analysis (dateconstructed, significant alterations, dates painted)
The doorway seems to have been moved

DATA: Microscopic Analysis

CODES		Reaction of	
-Finish	(F)	Sodium Sulfide	(Na_2S)
Primer	(P)	Hydrochloric Acid	(HCI)
Glaze	(G)	Dimethylformamide	(DMF)
Varnish	(V)	Methylene Chloride	(CH_2CL_2)
Shellac	(S)	Water	(H_2O)
Wall paper	(W)	Alcohol	(OH)
Fracture	( )	Turentine	(TURP)
Dirt Layer	(-)	Neer UV Light	(UV)

Note layers of decorative painting, if any: (graining, marbleizing, polychromy ect.). —

		Chromochronology	Comments		
	Substrate:				
9	1.	Bright white	CH_2Cl_2	Zinc Ox	
8	2.	—			
7	3.	yellow white	CH_2Cl	Zinc Ox	
6	4.	—			
5	5.	cream	DMF 0.1		
4	6.	—			
3	7.	yellow cream	Na_2S	HCl	0.1
2	8.	Bright white	Na_2S	HCl	0.1
1	9.	Bright white	Na_2S	HCl	0.1
	10.				
	11.	wood			
	12.				
	13.				
	14.				
	15.				

	Chromochronology	Comments
16.		
17.		
18.		
19.		
20.		
21.		
22.		
23.		
24.		
25.		
26.		
27.		
28.		
29.		
30.		

Summary:

Phase II: Analysis and Recommendations 24-m-P
Structure
Location of Sample: doorway molding – music room
Date Removed ______ Removed By ______

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis: try to date early layers

No. of Layers to be Studied
Reason for Layer Selection:
Visual Characteristics of Layer to be Matched: (relative thinness, thickness glassiness, ropiness, ect.):

MEDIUM ANALYSIS: (Separate paint/finishlayer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil	DMF	+ layer # 5-1
Latex	CH_2Cl_2	7,9
Whitewash/calcimine	HCl - slow react.	1-3
Waterbased/distemper		
Varnish		
Shellac		

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes ✓ no ___, Color yellow green
Probable pigment associated with flourescence:

	Possible Pigment Type	Spot Test	Reaction
1-3	lead	Na_2S	+ Black
7,9	Zinc ox	Potassium ferrocyanide	+ Blue color

PIGMENT AND MEDIUM TYPE: 1-3 / 7-9

Probable pigment(s): lead white / ~~lead~~ zinc ox / zinc ox
Probable medium: linseed oil / latex

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if approprate.)

Butens paint color ______ Sherwin-Williams ______

RECOMMENDATIONS

Color:
Paint Type:

DOCUMENTATION
Sample/slide NO:
Report prepared – Date: Jl 17 By Whom: MD

Phase II: Analysis and Recommendations 26-m-p
Structure ____________________
Location of Sample ____________________
Date Removed ____________________ Removed By ____________________

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis ____________________

No. of Layers to be Studied ____________________
Reason for Layer Selection: ____________________
Visual Characteristics of Layer to be Matched: (relative thinness, thickness glassiness, ropiness, ect.): ____________________

MEDIUM ANALYSIS: (Separate paint/finishlayer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil		
Latex		
Whitewash/calcimine		
Waterbased/distemper		
Varnish		
Shellac		

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes____ no____, Color ____________________
Probable pigment associated with flourescence: ____________________

Possible Pigment Type	Spot Test	Reaction

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): ____________________
Probable medium: ____________________

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if approprate.)

Butens paint color ____________________ Sherwin-Williams ____________________

RECOMMENDATIONS

Color: ____________________
Paint Type: ____________________

DOCUMENTATION
Sample/slide NO: ____________________
Report prepared - Date: __________ By Whom: ____________________

Phase I: Sequence of Layers 26-M-8

Structure Monsky

Location of Sample Doorway molding from garden to porch

Date Removed ______ Removed By ______

Significant Facts Regarding The Structure's History Which May Pertain The To The Analysis (date constructed, significant alterations, dates painted)

DATA: Microscopic Analysis

CODES		Reaction of	
Finish	(F)	Sodium Sulfide	(Na_2S)
Primer	(P)	Hydrochloric Acid	(HCl)
Glaze	(G)	Dimethylformamide	(DMF)
Varnish	(V)	Methylene Chloride	(CH_2Cl_2)
Shellac	(S)	Water	(H_2O)
Wall paper	(W)	Alcohol	(OH)
Fracture	( )	Turentine	(TURP)
Dirt Layer	(-)	Near UV Light	(UV)

Note layers of decorative painting, if any: (graining, marbleizing, polychromy, etc.).

	Chromochronology	Comments		Chromochronology	Comments
Substrate:	wood				
1.	White Cream	DMF	16.		
2.			17.		
3.			18.		
4.			19.		
5.			20.		
6.			21.		
7.			22.		
8.			23.		
9.			24.		
10.			25.		
11.			26.		
12.			27.		
13.			28.		
14.			29.		
15.			30.		

Summary: modern paint / no lead / no color

Phase I: Sequence of Layers b-m-m
Structure Monastery
Location of Sample Exterior SE wall main bldg W
Date Removed April 88 Removed By MJ
Significant Facts Regarding The Structure's History Which May Pertain The To The Analysis (dateconstructed, significant alterations, dates painted)
found below a layer of stucco

DATA: Microscopic Analysis

CODES		Reaction of	
-Finish	(F)	Sodium Sulfide	(Na_2S)
Primer	(P)	Hydrochloric Acid	(HCl)
Glaze	(G)	Dimethylformamide	(DMF)
Varnish	(V)	Methylene Chloride	(CH_2CL_2)
Shellac	(S)	Water	(H_2O)
Wall paper	(W)	Alcohol	(OH)
Fracture	( )	Turentine	(TURP)
Dirt Layer	(-)	Near UV Light	(UV)

Note layers of decorative painting, if any: (graining, marbleizing, polychromy ect.).

Substrate: stone

	Chromochronology	Comments
1.	white	HCl
2.	-	
3.	white	HCl
4.	-	
5.	white	HCl
6.	white	
7.	white	
8.	white	
9.	white	
10.	white	
11.	white	
12.		
13.		
14.		
15.		

	Chromochronology	Comments
16.		
17.		
18.		
19.		
20.		
21.		
22.		
23.		
24.		
25.		
26.		
27.		
28.		
29.		
30.		

Summary: No reaction w/ Na_2S

Phase II: Analysis and Recommendations k-m-m
Structure Monarch'd
Location of Sample
Date Removed Removed By

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis test 1st layer

No. of Layers to be Studied 1 + 2
Reason for Layer Selection: first layers
Visual Characteristics of Layer to be Matched: (relative thinness, thickness glassiness, ropiness, ect.):

MEDIUM ANALYSIS: (Separate paint/finishlayer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil	DMF	—
Latex		
Whitewash/calcimine	HCl	+
Waterbased/distemper	H_2O	—
Varnish		
Shellac		

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes ___ no ✓, Color
Probable pigment associated with flourescence:

Possible Pigment Type	Spot Test	Reaction
whiting	H_2SO_4	Positive/formation of needles - calcium sulfate

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): whiting
Probable medium: whitewash lime in H_2O

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if approprate.)

Butens paint color NA Sherwin-Williams NA

RECOMMENDATIONS

Color: lime wash: saturated lime putty ~~thinned~~ thinner with H_2O to
Paint Type: make thin paste

DOCUMENTATION
Sample/slide NO:
Report prepared - Date: By Whom:

Phase I: Sequence of Layers 9-m-m
Structure Monaheen
Location of Sample Exterior NW wall kitchen wing, west corner
Date Removed Mar 1988 Removed By MV
Significant Facts Regarding The Structure's History Which May Pertain The To The Analysis (dateconstructed, significant alterations, dates painted)
to find how many layers on exterior of building

DATA: Microscopic Analysis

CODES		Reaction of	
-Finish	(F)	Sodium Sulfide	(Na_2S)
Primer	(P)	Hydrochloric Acid	(HCl)
Glaze	(G)	Dimethylformamide	(DMF)
Varnish	(V)	Methylene Chloride	(CH_2CL_2)
Shellac	(S)	Water	(H_2O)
Wall paper	(W)	Alcohol	(OH)
Fracture	( )	Turentine	(TURP)
Dirt Layer	(-)	Neat UV Light	(UV)

Note layers of decorative painting, if any: (graining, marbleizing, polychromy ect.).

	Chromochronology	Comments	
Substrate:	mortar	HCL	Na_2S
1.	Brown white	HCl	—
2.	" "	HCl	—
3.	"	HCl	—
4.	" "	HCl	—
5.	*		
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			

	Chromochronology	Comments
16.		
17.		
18.		
19.		
20.		
21.		
22.		
23.		
24.		
25.		
26.		
27.		
28.		
29.		
30.		

Summary: White wash

Phase II: Analysis and Recommendations 9 m - m
Structure ____________
Location of Sample ____________
Date Removed ____________ Removed By ____________

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis ____________

No. of Layers to be Studied ____________
Reason for Layer Selection: ____________
Visual Characteristics of Layer to be Matched: (relative thinness, thickness glassiness, ropiness, ect.): ____________

MEDIUM ANALYSIS: (Separate paint/finishlayer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil		
Latex		
Whitewash/calcimine		
Waterbased/distemper		
Varnish		
Shellac		

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes____no____, Color ____________
Probable pigment associated with flourescence: ____________

Possible Pigment Type	Spot Test	Reaction

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): ____________
Probable medium: ____________

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if approprate.)

Butens paint color ____________ Sherwin-Williams ____________

RECOMMENDATIONS

Color: ____________
Paint Type: ____________

DOCUMENTATION
Sample/slide NO: ____________
Report prepared - Date: ________ By Whom: ____________

Phase I: Sequence of Layers 12-m-m
Structure Mmarie's
Location of Sample kitchen left mortar above window
Date Removed ______ Removed By ______
Significant Facts Regarding The Structure's History which May Pertain The To The Analysis (dateconstructed, significant alterations, dates painted)

DATA: Microscopic Analysis

CODES		Reaction of	
-Finish	(F)	Sodium Sulfide	(Na_2S)
Primer	(P)	Hydrochloric Acid	(HCI)
Glaze	(G)	Dimethylformamide	(DMF)
Varnish	(V)	Methylene Chloride	(CH_2CL_2)
Shellac	(S)	Water	(H_2O)
Wall paper	(W)	Alcohol	(OH)
Fracture	( )	Turentine	(TURP)
Dirt Layer	(-)	Near UV Light	(UV)

Note layers of decorative painting, if any: (graining, marbleizing, polychromy ect.).

	Chromochronology	Comments
Substrate:	mortar	
1.	white	
2.	white	
3.	rose	
4.	white	
5.	white	
6.	white	
7.	—	
8.	white	
9.	white	
10.	white	
11.	—	
12.	thick white	
13.	—	
14.	thick white	
15.	white	

	Chromochronology	Comments
16.		
17.		
18.		
19.		
20.		
21.		
22.		
23.		
24.		
25.		
26.		
27.		
28.		
29.		
30.		

Summary:
white wash

Phase II: Analysis and Recommendations IL m-m
Structure ______
Location of Sample ______
Date Removed ______ Removed By ______

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis ______

No. of Layers to be Studied ______
Reason for Layer Selection: ______
Visual Characteristics of Layer to be Matched: (relative thinness, thickness glassiness, ropiness, ect.): ______

MEDIUM ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil		
Latex		
Whitewash/calcimine	HCl	+
Waterbased/distemper		
Varnish		
Shellac		

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes ___ no ✓, Color ______
Probable pigment associated with flourescence: ______

Possible Pigment Type	Spot Test	Reaction
Na_2S	lead	–
HCl	+	

PIGMENT AND MEDIUM TYPE: unable to test #3 because whole sample contaminated with iron

Probable pigment(s): white wash
Probable medium: ______

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if approprate.)

Butens paint color ______ Sherwin-Williams ______

RECOMMENDATIONS

Color: ______
Paint Type: ______

DOCUMENTATION
Sample/slide NO: ______
Report prepared - Date: ______ By Whom: ______

Phase I: Sequence of Layers 18-m-m
Structure Monastery
Location of Sample Plaster layer over 15-m-m / music Room
Date Removed April 1988 Removed By MVZ
Significant Facts Regarding The Structure's History which May Pertain The To The Analysis (dateconstructed, significant alterations, dates painted)

DATA: Microscopic Analysis

CODES		Reaction of	
-Finish	(F)	Sodium Sulfide	(Na_2S)
Primer	(P)	Hydrochloric Acid	(HCI)
Glaze	(G)	Dimethylformamide	(DMF)
Varnish	(V)	Methylene Chloride	(CH_2CL_2)
Shellac	(S)	Water	(H_2O)
Wall paper	(W)	Alcohol	(OH)
Fracture	( )	Turentine	(TURP)
Dirt Layer	(-)	Near UV Light	(UV)

Note layers of decorative painting, if any: (graining, marbleizing, polychromy ect.).

	Chromochronology	Comments	
Substrate:	Mortar		
1.	Plaster (Pink tinge)		
2.	white	Na_2S U	DMF
3.	Glaze	—	DMF
4.	Yellow white	Na_2S	DMF
5.	orange	Na_2S	DMF
6.	red	—	DMF
7.	—		
8.	yellow	Na_2S	DMF
9.	Blue	Na_2S	DMF
10.	Cream		DMF
11.	Green		DMF
12.			
13.			
14.			
15.			

	Chromochronology	Comments
16.		
17.		
18.		
19.		
20.		
21.		
22.		
23.		
24.		
25.		
26.		
27.		
28.		
29.		
30.		

Summary:

Phase II: Analysis and Recommendations 18-m-m
Structure Monastery
Location of Sample Same
Date Removed April 1988 Removed By MVG

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis #1

No. of Layers to be Studied
Reason for Layer Selection:
Visual Characteristics of Layer to be Matched: (relative thinness, thickness glassiness, ropiness, ect.):

MEDIUM ANALYSIS: (Separate paint/finishlayer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil	Imf	Softened
Latex		
Whitewash/calcimine		
Waterbased/distemper		
Varnish		
Shellac		

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes___ no___, Color
Probable pigment associated with flourescence:

Possible Pigment Type	Spot Test	Reaction
#1 Lead white	Na_2S	turned Black

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): Lead white
Probable medium: Linseed oil

COLOR: (Match sample to color standards: place under UV light for bleaching purposes if approprate.)

Butens paint color ________ Sherwin-Williams ________

RECOMMENDATIONS

Color:
Paint Type:

DOCUMENTATION
Sample/slide NO:
Report prepared - Date: ________ By Whom:

Phase I: Sequence of Layers 20-m-m
Structure monastery
Location of Sample Interior NW Wall above entry door | Parlor
Date Removed May 22 Removed By MJ
Significant Facts Regarding The Structure's History Which May Pertain The To The Analysis (dateconstructed, significant alterations, dates painted)
layer between 6-m-m + 21-m-m

DATA: Microscopic Analysis

CODES		Reaction of	
-Finish	(F)	Sodium Sulfide	(Na_2S)
Primer	(P)	Hydrochloric Acid	(HCI)
Glaze	(G)	Dimethylformamide	(DMF)
Varnish	(V)	Methylene Chloride	CH_2CL_2
Shellac	(S)	Water	(H_2O)
Wall paper	(W)	Alcohol	(OH)
Fracture	( )	Turentine	(TURP)
Dirt Layer	(-)	Near UV Light	(UV)

Note layers of decorative painting, if any: (graining, marbleizing, polychromy ect.).

	Chromochronology	Comments
Substrate:	Mortar HCl	Na_2S
1.	plaster +	–
2.	glaze +	–
3.	white +	–
4.		
5.		
6.		
7.		
8.		
9.		
10.		
11.		
12.		
13.		
14.		
15.		

	Chromochronology	Comments
16.		
17.		
18.		
19.		
20.		
21.		
22.		
23.		
24.		
25.		
26.		
27.		
28.		
29.		
30.		

Summary:

Phase II: Analysis and Recommendations 22-111-171
Structure
Location of Sample
Date Removed Removed By

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis

No. of Layers to be Studied
Reason for Layer Selection:
Visual Characteristics of Layer to be Matched: (relative thinness, thickness glassiness, ropiness, ect.):

MEDIUM ANALYSIS: (Separate paint/finishlayer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil		
Latex		
Whitewash/calcimine	HCl	bubbles
Waterbased/distemper		
Varnish		
Shellac		

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes___ no ✓, Color
Probable pigment associated with flourescence:

Possible Pigment Type	Spot Test	Reaction
Whiting	HCl	+

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): whitewash ~ thin plaster layer
Probable medium:

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if approprate.)

Butens paint color Sherwin-Williams

RECOMMENDATIONS

Color:
Paint Type:

DOCUMENTATION
Sample/slide NO:
Report prepared - Date: By Whom:

ex. 21 (continued)

MORTAR ANALYSIS: DATA SHEET

Name ______________ Sample No. ______________

Date ______________ Origin of sample ______________

Visual description of sample (color, texture, hardness, inclusions, etc.): ______________

Mortar Analysis :

Original weight of powdered sample (W_1) = 25.1?

Weight of filter paper (W_2) = 6.29 + .54 = 6.83

Weight of filter paper + dry fines (W_3) = 10.40

Weight of dry fines ($W_3 - W_2$) = 4.11

Weight of dry sand (W_4) = 13.52

% of sand ((W_4/W_1) x 100) = [illegible]

% of fines (($W_3 - W_2)/W_1$ x 100) = [illegible]

% of dissolved binder = [illegible]

Observations: dissolution of binder, color of liquid: ______________

Characterization of Sand:

Microscopic Examination ______________

% Finer than		
4.75	mm	—
2.36	mm	—
1.18	mm	[illegible]
600	um	[illegible]
300	um	[illegible]
150	um	[illegible]
75	um	[illegible]
53	um	[illegible]
38	um	

ex. 21 (continued)

MORTAR ANALYSIS: DATA SHEET

Name ______________ Sample No. [illegible]

Date [illegible] Origin of sample [illegible]

Visual description of sample (color, texture, hardness, inclusions, etc.): [illegible]

Mortar Analysis:

Original weight of powdered sample (W_1) = [illegible]

Weight of filter paper (W_2) = 6.30 + .53 6.83

Weight of filter paper + dry fines (W_3) = 7.85

Weight of dry fines ($W_3 - W_2$) = 1.02

Weight of dry sand (W_4) = 10.44

% of sand ((W_4/W_1) x 100) = [illegible]

% of fines (($W_3 - W_2$)/W_1 x 100) = [illegible]

% of dissolved binder = [illegible]

Observations: dissolution of binder, color of liquid: ______________

Characterization of Sand:

Microscopic Examination

% Finer than		
4.75 mm		
2.36 mm	2	1.75
1.18 mm	[illegible]	12.63
600 um	[illegible]	[illegible]
300 um	[illegible]	[illegible]
150 um	[illegible]	[illegible]
75 um	[illegible]	[illegible]
53 um	[illegible]	[illegible]
38 um		

ex. 21 (continued)

MORTAR ANALYSIS: DATA SHEET Deep main

Name ______________________ Sample No. 3-m-m

Date ______________________ Origin of sample monastery Exterior S.E. wall, Kitchen wing Below Deep main 1-m-m

Visual description of sample (color, texture, hardness, inclusions, etc.): Soft, & chunks of lime yellow Brown

Iron chunk

2 = Lime green with ... yellow

Mortar Analysis :

Original weight of powdered sample (W_1) = 25.06

Weight of filter paper (W_2) = 6.22 + .57 = 6.79

Weight of filter paper + dry fines (W_3) = 10.72 g

Weight of dry fines (W_3 - W_2) = 3.93 g

Weight of dry sand (W_4) = 9.37 g

% of sand ((W_4/W_1) x 100) = 37.39 %

% of fines ((W_3 - W_2)/W_1 x 100) = 15.68 %

% of dissolved binder = 53.07 %

Observations: dissolution of binder, color of liquid: ______

____

Characterization of Sand:

Microscopic Examination

% Finer than ~~4.75 mm~~
2.36 mm
1.18 mm
600 um
300 um
150 um
75 um
~~53 um~~
~~38 um~~

ex. 21 (continued)

MORTAR ANALYSIS: DATA SHEET

Name ______________________ Sample No. ______________________

Date ______________________ Origin of sample ______________________

Visual description of sample (color, texture, hardness, inclusions, etc.): ______________________

Mortar Analysis :

Original weight of powdered sample (W_1) = 25.04

Weight of filter paper (W_2) = 6.30 + 6.83

Weight of filter paper + dry fines (W_3) = 7.88

Weight of dry fines ($W_3 - W_2$) = 1.05

Weight of dry sand (W_4) = 9.28

% of sand ((W_4/W_1) x 100) = 37.[illegible]

% of fines (($W_3 - W_2$)/W_1 x 100) = 4.[illegible]

% of dissolved binder = [illegible]

Observations: dissolution of binder, color of liquid: ______________________

Characterization of Sand:

Microscopic Examination

% Finer than		
4.75	mm	
2.36	mm	
1.18	mm	[illegible]
600	um	[illegible]
300	um	[illegible]
150	um	[illegible]
75	um	[illegible]
53	um	
38	um	

ex. 21 (continued)

MORTAR ANALYSIS: DATA SHEET

Name ______________________ Sample No. S-m-m

Date [illegible] Origin of sample [illegible]

Visual description of sample (color, texture, hardness, inclusions, etc.): [illegible]

Mortar Analysis :

Original weight of powdered sample (W_1) =	25.[illegible]
Weight of filter paper (W_2) =	6.28 + .57 = 6.85
Weight of filter paper + dry fines (W_3) =	11.29
Weight of dry fines (W_3 - W_2) =	4.44
Weight of dry sand (W_4) =	11.77
% of sand ((W_4/W_1) x 100) =	46.72
% of fines ((W_3 - W_2)/W_1 x 100) =	17.6[illegible]
% of dissolved binder =	35.[illegible]

Observations: dissolution of binder, color of liquid: [illegible]

Characterization of Sand:

Microscopic Examination

% Finer than	
4.75 mm	
2.36 mm	[illegible]
1.18 mm	[illegible]
600 um	[illegible]
300 um	[illegible]
150 um	[illegible]
75 um	[illegible]
53 um	[illegible]
38 um	

ex. 21 (continued)

MORTAR ANALYSIS: DATA SHEET

Name ______________________ Sample No. 6-m-m

Date ______________________ Origin of sample Monastery Exterior NW wall E corner main Building pointing below 6-m-m-S

Visual description of sample (color, texture, hardness, inclusions, etc.): white w/ aggregate very noticeable very hard.

Iron fragments

Mortar Analysis :

Original weight of powdered sample (W_1) =	25.01
Weight of filter paper (W_2) =	5.84r .57=6.42
Weight of filter paper + dry fines (W_3) =	8.17 [illegible]
Weight of dry fines (W_3 - W_2) =	1.75 [illegible]
Weight of dry sand (W_4) =	11.19 [illegible]
% of sand ((W_4/W_1) x 100) =	44.74 [illegible]
% of fines ((W_3 - W_2)/W_1 x 100) =	6.[illegible]
% of dissolved binder =	48.2[illegible]

Observations: dissolution of binder, color of liquid: [illegible] green liquid

11.19

Characterization of Sand:

Microscopic Examination

% Finer than			
4.75 mm	[illegible]		
2.36 mm	[illegible]	[illegible]	
1.18 mm	[illegible]5	[illegible]	
600 um	[illegible]	[illegible]	
300 um	[illegible]	[illegible]	
150 um	1.[illegible]2	17.31 [illegible]	
75 um	[illegible]7	[illegible]	
53 um	[illegible]	[illegible]	
~~38 um~~			
[illegible]	11.09		

ex. 21 (continued)

MORTAR ANALYSIS: DATA SHEET

Name ______________________ Sample No. [illegible]

Date [illegible] Origin of sample [illegible]

Visual description of sample (color, texture, hardness, inclusions, etc.): [illegible] (iron shards)

Mortar Analysis :

Original weight of powdered sample (W_1) =	25 [illegible]
Weight of filter paper (W_2) =	6.27 + [illegible] 6.83
Weight of filter paper + dry fines (W_3) =	8.33
Weight of dry fines (W_3 - W_2) =	1.50
Weight of dry sand (W_4) =	18.45
% of sand ((W_4/W_1) x 100) =	[illegible]
% of fines ((W_3 - W_2)/W_1 x 100) =	[illegible]
% of dissolved binder =	[illegible] %

Observations: dissolution of binder, color of liquid: ______

Characterization of Sand:

Microscopic Examination

% Finer than		
4.75 mm		
2.36 mm	[illegible]	3.23
1.18 mm	[illegible]	4.21
600 um	[illegible]	[illegible]
300 um	[illegible]	[illegible]
150 um	[illegible]	[illegible]
75 um	[illegible]	[illegible]
53 um	[illegible]	
38 um		

ex. 21 (continued)

MORTAR ANALYSIS: DATA SHEET

Name________ Sample No. 7-m-m

Date June 16 1988 Origin of sample Monastery 1980 portland cement SW wall main building

Visual description of sample (color, texture, hardness, inclusions, etc.): uniform grey color - very hard

iron fragments

Mortar Analysis :

Original weight of powdered sample (W_1) =	25.06
Weight of filter paper (W_2) =	5.88 + .51 = 6.39
Weight of filter paper + dry fines (W_3) =	7.72 gr
Weight of dry fines ($W_3 - W_2$) =	1.33 g
Weight of dry sand (W_4) =	18.38 gr
% of sand ((W_4/W_1) x 100) =	73.34 %
% of fines (($W_3 - W_2)/W_1$ x 100) =	5.30 %
% of dissolved binder =	2.36 %

Observations: dissolution of binder, color of liquid:________

18.38

Characterization of Sand:

Microscopic Examination

% Finer than		
4.75	mm	
2.36	mm	[illegible]
1.18	mm	[illegible]
600	um	[illegible]
300	um	[illegible]
150	um	[illegible]
75	um	[illegible]
53	um	[illegible]
38	um	

3.25

ex. 21 (continued)

MORTAR ANALYSIS: DATA SHEET

Name ______________________ Sample No. 8-m-m

Date June 21 Origin of sample Monastery Deep mortar sample from when 20th century Door introduced into wall

Visual description of sample (color, texture, hardness, inclusions, etc.): Yellow - burnt umber in color, straw content Chunks of Lime, 1mm aggregate soft.

wood [illegible]

Mortar Analysis :

Original weight of powdered sample (W_1) =	25.01
Weight of filter paper (W_2) =	6.34 + .56 = 6.90
Weight of filter paper + dry fines (W_3) =	13.88
Weight of dry fines ($W_3 - W_2$) =	6.98
Weight of dry sand (W_4) =	7.43
% of sand ((W_4/W_1) x 100) =	29.70 %
% of fines (($W_3 - W_2$)/W_1 x 100) =	27.[illegible] %
% of dissolved binder =	42.49 %

Observations: dissolution of binder, color of liquid: ______

Characterization of Sand:

Microscopic Examination

% Finer than			
4.75	mm		
2.36	mm	[illegible]	[illegible]
1.18	mm	[illegible]	[illegible]
600	um	130	[illegible]
300	um	[illegible]	27.71 %
150	um	[illegible]	21.27 %
75	um	[illegible]	9.62 %
53	um	[illegible]	[illegible] %
38	um		

ex. 21 (continued)

MORTAR ANALYSIS: DATA SHEET

Name ______________________ Sample No. ______________

Date ______________________ Origin of sample ______________

Visual description of sample (color, texture, hardness, inclusions, etc.): ______________

Lt. lime green

Mortar Analysis :

Original weight of powdered sample (W_1) = ______

Weight of filter paper (W_2) = 6.25 + .54 = 6.79

Weight of filter paper + dry fines (W_3) = 11.31

Weight of dry fines (W_3 - W_2) = 4.51

Weight of dry sand (W_4) = 11.51

% of sand ((W_4/W_1) x 100) = ______

% of fines ((W_3 - W_2)/W_1 x 100) = ______

% of dissolved binder = ______

Observations: dissolution of binder, color of liquid: ______

Characterization of Sand:

Microscopic Examination

% Finer than 4.75 mm ______
2.36 mm ______
1.18 mm ______
600 um ______
300 um ______
150 um ______
75 um ______
53 um ______
38 um ______

D.M.

ex. 21 (continued)

MORTAR ANALYSIS: DATA SHEET

Name ______________________ Sample No. ~~3~~ 10 m-m

Date ______________________ Origin of sample monastery, [illegible] ~~[illegible]~~

Visual description of sample (color, texture, hardness, inclusions, etc.): Burnt umber in color, lime chunks, large stones in some areas, soft

Liquid → ~~[illegible]~~ Lime green

Mortar Analysis :

Original weight of powdered sample (W_1) =	25.01
Weight of filter paper (W_2) =	6.24 + .56 = 6.80
Weight of filter paper + dry fines (W_3) =	11.89
Weight of dry fines ($W_3 - W_2$) =	5.09
Weight of dry sand (W_4) =	11.03
% of sand ((W_4/W_1) x 100) =	44.10
% of fines (($W_3 - W_2)/W_1$ x 100) =	20.35 %
% of dissolved binder =	% 35.55

Observations: dissolution of binder, color of liquid: ______

11.03

Characterization of Sand:

Microscopic Examination

% Finer than		
4.75	mm	—
2.36	mm	[illegible]
1.18	mm	[illegible]
600	um	[illegible]
300	um	[illegible]
150	um	[illegible]
75	um	77
53	um	[illegible]
38	um	

ex. 21 (continued)

MORTAR ANALYSIS: DATA SHEET

Name ____________________ Sample No. 1Hm-m

Date ____________________ Origin of sample Monastery Interior, Center of NW wall Kitchen wing mortar & paint sample below ceiling between [illegible]

Visual description of sample (color, texture, hardness, inclusions, etc.): Hard, chunks of lime, white fibers, white [illegible] matrix w/ chunks of lime

Iron shards

Mortar Analysis :

Original weight of powdered sample (W_1) = 25.07

Weight of filter paper (W_2) = 5.79 + .53 = 6.32 g.

Weight of filter paper + dry fines (W_3) = [illegible] g

Weight of dry fines (W_3 - W_2) = 3.21 g

Weight of dry sand (W_4) = 13.59 g

% of sand ((W_4/W_1) x 100) = 54.20%

% of fines ((W_3 - W_2)/W_1 x 100) = 12.80 %

% of dissolved binder = 32.9%

Observations: dissolution of binder, color of liquid: [illegible]

Characterization of Sand:

Microscopic Examination

% Finer than		
4.75 mm	—	
2.36 mm	—	
1.18 mm	[illegible]	[illegible]
600 um	[illegible]	[illegible]
300 um	[illegible]	[illegible]
150 um	[illegible]	[illegible]
75 um	[illegible]	[illegible]
53 um	[illegible]	[illegible]
38 um		

13.57

ex. 21 (continued)

MORTAR ANALYSIS: DATA SHEET

Name________________ Sample No. [illegible]

Date________________ Origin of sample [illegible]

Visual description of sample (color, texture, hardness, inclusions, etc.): [illegible] Orange liquid

---

Mortar Analysis :

Original weight of powdered sample (W_1) =	25.16
Weight of filter paper (W_2) =	6.20 + 52=6.73
Weight of filter paper + dry fines (W_3) =	9.40
Weight of dry fines ($W_3 - W_2$) =	2.67
Weight of dry sand (W_4) =	12.38
% of sand ((W_4/W_1) x 100) =	49.2%
% of fines (($W_3 - W_2$)/W_1 x 100) =	[illegible]
% of dissolved binder =	40.2%

Observations: dissolution of binder, color of liquid: [illegible]

Characterization of Sand:

Microscopic Examination

% Finer than		
4.75	mm	—
2.36	mm	[illegible]
1.18	mm	[illegible]
600	um	[illegible]
300	um	[illegible]
150	um	[illegible]
75	um	[illegible]
53	um	[illegible]
38	um	

MORTAR ANALYSIS: DATA SHEET

Name ______________ Sample No. B-m-mA

Date ______________ Origin of sample Monastery
Interior, crawl space above existing kitchen
White pointing mortar in wall of main building

Visual description of sample (color, texture, hardness, inclusions, etc.): White - hard various size of aggregate
Iron shards

Mortar Analysis :

Original weight of powdered sample (W_1) = 25.11

Weight of filter paper (W_2) = 5.82 - .53 = 6.35

Weight of filter paper + dry fines (W_3) = 7.45 g

Weight of dry fines ($W_3 - W_2$) = 1.10 g

Weight of dry sand (W_4) = 9.29

% of sand ((W_4/W_1) x 100) = 36.99%

% of fines (($W_3 - W_2)/W_1$ x 100) = 4.38%

% of dissolved binder = 58.63%

Observations: dissolution of binder, color of liquid: ________

6.28

Characterization of Sand:

Microscopic Examination

% Finer than 4.75 mm —
2.36 mm
1.18 mm
600 um
300 um
150 um
75 um
53 um
38 um

ex. 21 (continued)

MORTAR ANALYSIS: DATA SHEET

Name mJ Sample No. 13-m-m-B

Date June 1[illegible] Origin of sample monastery

Interior, crawl space above modern Kitchen, original exposal NE wall of main building, yellow morter below white pointing

Visual description of sample (color, texture, hardness, inclusions, etc.): yellow almost Burnt Umber in color, Chunks of Lime, large percent of quartz,

---

Mortar Analysis :

Original weight of powdered sample (W_1) =	25.20
Weight of filter paper (W_2) =	6.36 + .56 = 6.92
Weight of filter paper + dry fines (W_3) =	15.25
Weight of dry fines (W_3 - W_2) =	8.33
Weight of dry sand (W_4) =	9.51
% of sand ((W_4/W_1) x 100) =	37.73 [illegible]
% of fines ((W_3 - W_2)/W_1 x 100) =	33.[illegible]
% of dissolved binder =	2[illegible]

Observations: dissolution of binder, color of liquid:

[illegible]

Characterization of Sand:

Microscopic Examination

% Finer than			
4.75	mm	—	
2.36	mm	2[illegible]	
1.18	mm	[illegible]	
600	um	[illegible]	[illegible]
300	um	[illegible]	[illegible]
150	um	[illegible]	[illegible]
75	um	[illegible]	[illegible]
53	um	[illegible]	[illegible]
38	um		

[illegible]

ex. 21 (continued)

MORTAR ANALYSIS: DATA SHEET

Name __________ Sample No. 14-m-m

Date June 21 1988 Origin of sample Monastery Interior, transept above kitchen (modern) original kitchen wall, SE wall.

Visual description of sample (color, texture, hardness, inclusions, etc.): White, chunks of lime, hard various size of aggregate.

[illegible]

L: yellow orange

Mortar Analysis :

Original weight of powdered sample (W_1) =	25.16
Weight of filter paper (W_2) =	6.24 + .57 = 6.81
Weight of filter paper + dry fines (W_3) =	9.65
Weight of dry fines ($W_3 - W_2$) =	2.84
Weight of dry sand (W_4) =	12.22
% of sand ((W_4/W_1) x 100) =	42. [illegible]
% of fines (($W_3 - W_2$)/W_1 x 100) =	[illegible] 3 [illegible]
% of dissolved binder =	[illegible]

Observations: dissolution of binder, color of liquid: [illegible]

12.19

Characterization of Sand:

Microscopic Examination

% Finer than			
4.75 mm			11.73 [illegible]
2.36 mm	[illegible]		[illegible]
1.18 mm	[illegible]		[illegible]
600 um	[illegible]		[illegible]
300 um	[illegible]		[illegible]
150 um	[illegible]		[illegible]
75 um	[illegible]		[illegible] 43
53 um	9		
38 um			

[illegible]

ex. 21 (continued)

MORTAR ANALYSIS: DATA SHEET

Name ______________ Sample No. 16-m-m

Date ______________ Origin of sample monastery Interior, NW wall Parlor above floor Layer over 20-m-m & 21-m-m

Visual description of sample (color, texture, hardness, inclusions, etc.): White Plaster - fine & even Plaster w/ Brown Coat Below Ironshards

---

Mortar Analysis :

Original weight of powdered sample (W_1) = 25. 4

Weight of filter paper (W_2) = 5714.55 = 6.26

Weight of filter paper + dry fines (W_3) = 7.66 g

Weight of dry fines (W_3 - W_2) = 1.40 g

Weight of dry sand (W_4) = 12.79 g

% of sand ((W_4/W_1) x 100) = 51.07%

% of fines ((W_3 - W_2)/W_1 x 100) = 5.5 %

% of dissolved binder = 43.34%

Observations: dissolution of binder, color of liquid: ______________

Characterization of Sand:

Microscopic Examination

% Finer than 4.75 mm
2.36 mm
1.18 mm
600 um
300 um
150 um
75 um
53 um
38 um

ex. 21 (continued)

MORTAR ANALYSIS: DATA SHEET

Name ____________________ Sample No. 15-m-m

Date ____________________ Origin of sample monastery
Interior wall room a ... Room
S... wall ... 15-m-m

Visual description of sample (color, texture, hardness, inclusions, etc.): white Brown w/ fine ... ~~...~~ ... visible
... fragments

Mortar Analysis :

Original weight of powdered sample (W_1) = ____

Weight of filter paper (W_2) = 6.32 ~~...~~ ... = 6.87

Weight of filter paper + dry fines (W_3) = ~~8.02~~ 7.98

Weight of dry fines (W_3 - W_2) = ~~...~~ 1.11

Weight of dry sand (W_4) = 14.79

% of sand ((W_4/W_1) x 100) = 55.5%

% of fines ((W_3 - W_2)/W_1 x 100) = 4.4%

% of dissolved binder = ____

Observations: dissolution of binder, color of liquid: ____

-.76

Characterization of Sand:

Microscopic Examination

% Finer than 4.75 mm ____
2.36 mm ____
1.18 mm ____
600 um ____
300 um ____
150 um 4.01
75 um ____
53 um ____
38 um ____

1

tray

ex. 21 (continued)

MORTAR ANALYSIS: DATA SHEET

Name____________________ Sample No. 17-m-m

Date [illegible] 14 19[illegible] Origin of sample [illegible]

Visual description of sample (color, texture, hardness, inclusions, etc.): [illegible]

Mortar Analysis :

Original weight of powdered sample (W_1) =	25.05
Weight of filter paper (W_2) =	6.30 : 6.85
Weight of filter paper + dry fines (W_3) =	9.77
Weight of dry fines (W_3 - W_2) =	2.92
Weig[illegible] of dry sand (W_4) =	14.75
% of sand ((W_4/W_1) x 100) =	58.9
% of fines ((W_3 - W_2)/W_1 x 100) =	11.37 [illegible]
% of dissolved binder =	2[illegible].43 %

Observations: dissolution of binder, color of liquid:________

14.72

Characterization of Sand:

Microscopic Examination

% Finer than			
4.75	mm	[illegible]	
2.36	mm	[illegible]	[illegible]
1.18	mm	[illegible]	[illegible]
600	um	1.23	[illegible]
300	um	3.27	
150	um	[illegible]	23.[illegible]
75	um	[illegible]	15.5[illegible]
53	um	1.79	12.[illegible]
38	um		

14.55

ex. 21 (continued)

MORTAR ANALYSIS: DATA SHEET

Name ______________________ Sample No. 21-m-m

Date June 16 1988 Origin of sample Interior, NW Wall, parlor above the door from the entry to the parlor, -brown coat below 20-m-m

Visual description of sample (color, texture, hardness, inclusions, etc.): variation in aggregate size, [illegible] fiber mica, Yellow Brown -soft

[illegible]

Mortar Analysis:

Original weight of powdered sample (W_1) = 25.05

Weight of filter paper (W_2) = 6.24 + .56 = 6.30

Weight of filter paper + dry fines (W_3) = [illegible]

Weight of dry fines (W_3 - W_2) = 1.33 [illegible]

Weight of dry sand (W_4) = 15 [illegible]

% of sand ((W_4/W_1) x 100) = 61.7 [illegible]

% of fines ((W_3 - W_2)/W_1 x 100) = [illegible]

% of dissolved binder = 32. [illegible]

Observations: dissolution of binder, color of liquid: ______

[illegible] Brown liquid

15.45

Characterization of Sand:

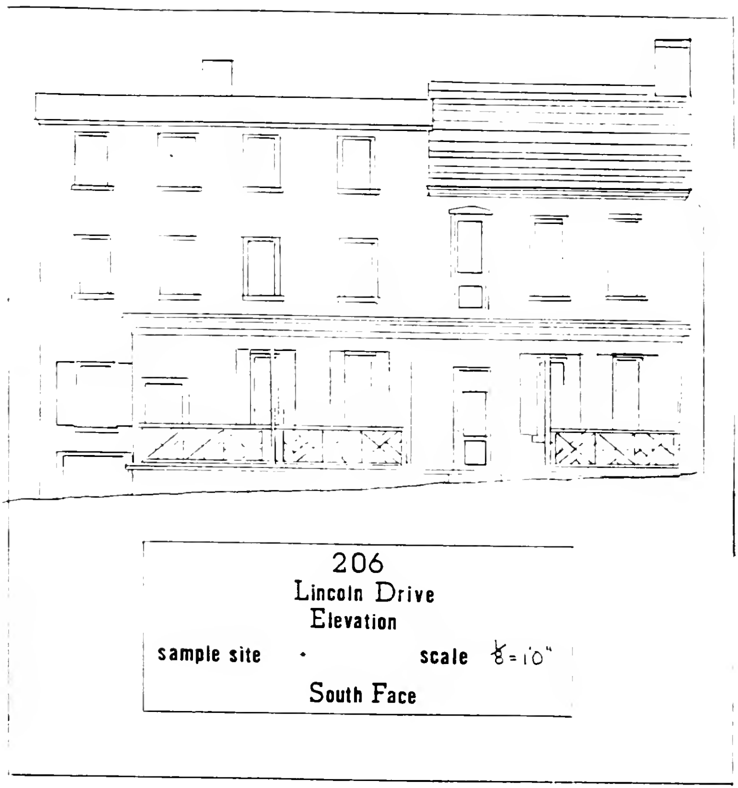
Microscopic Examination

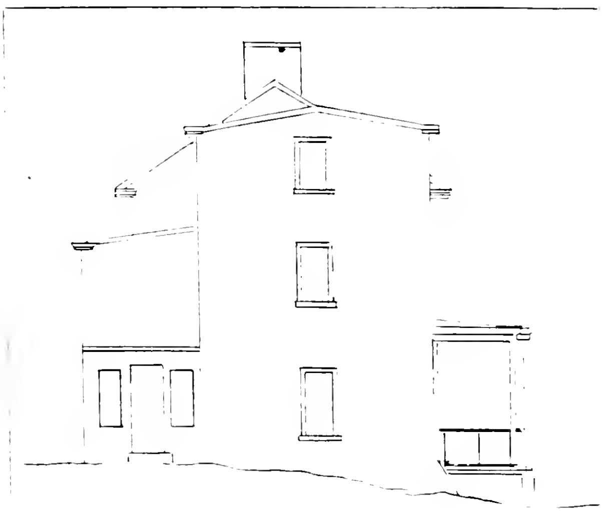
% Finer than

~~4.75~~	~~mm~~		
2.36	mm	.06	.39 %
1.18	mm	.36	2.35 %
600	um	1.87	12.21 %
300	um	7.79	50.88 %
150	um	4.42	28.87 %
75	um	.71	4.63 %
53	um	.10	.65 %
38	um		
total		15.31	.9 % loss

Appendix #15
346 Lincoln Drive
Elevations and Floor Plans

Elevations are from the Fairmount Park Commission files 346 Lincoln Drive. Floor plans were done from visual inspection of the building.

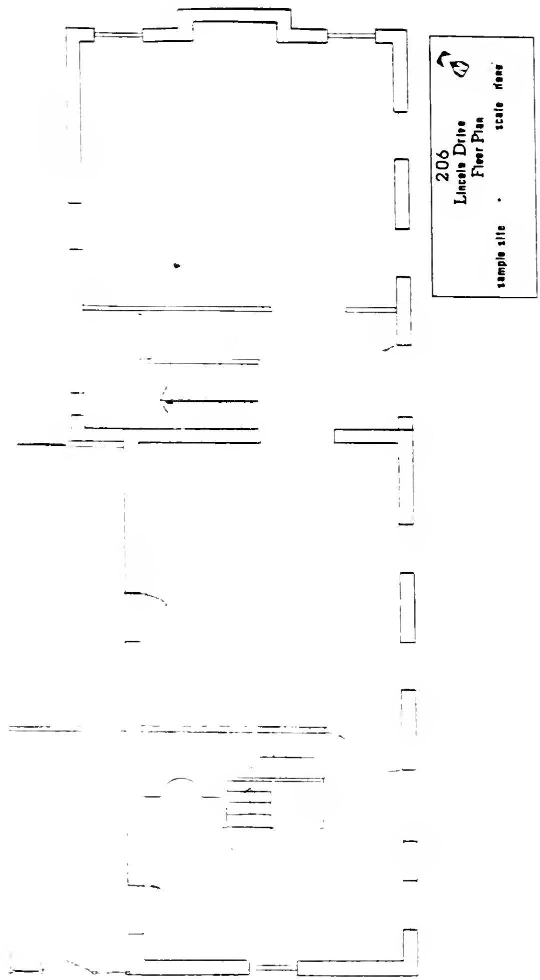

206
Lincoln Drive
Elevation
sample site
scale 1/8 = 1'0"
South Face

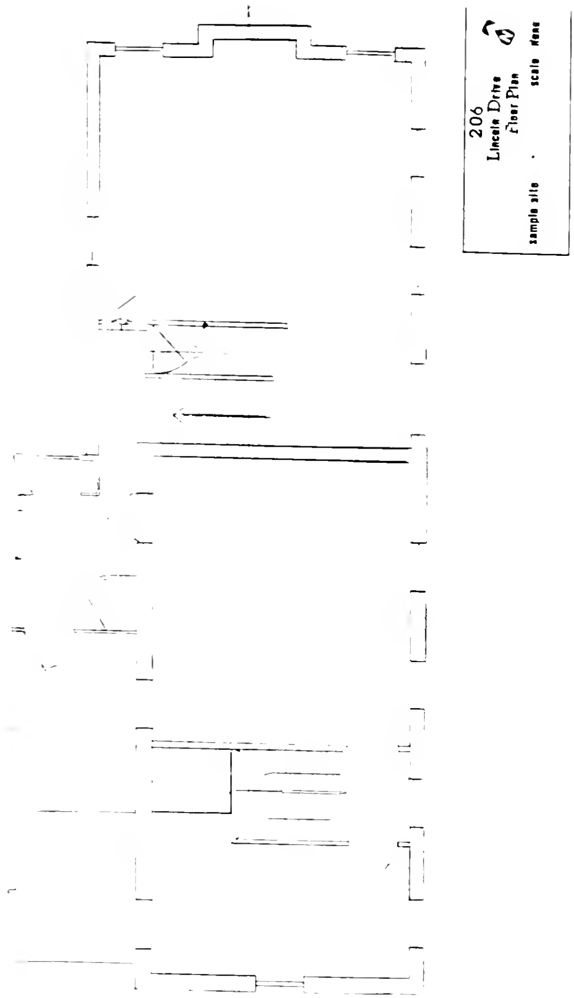


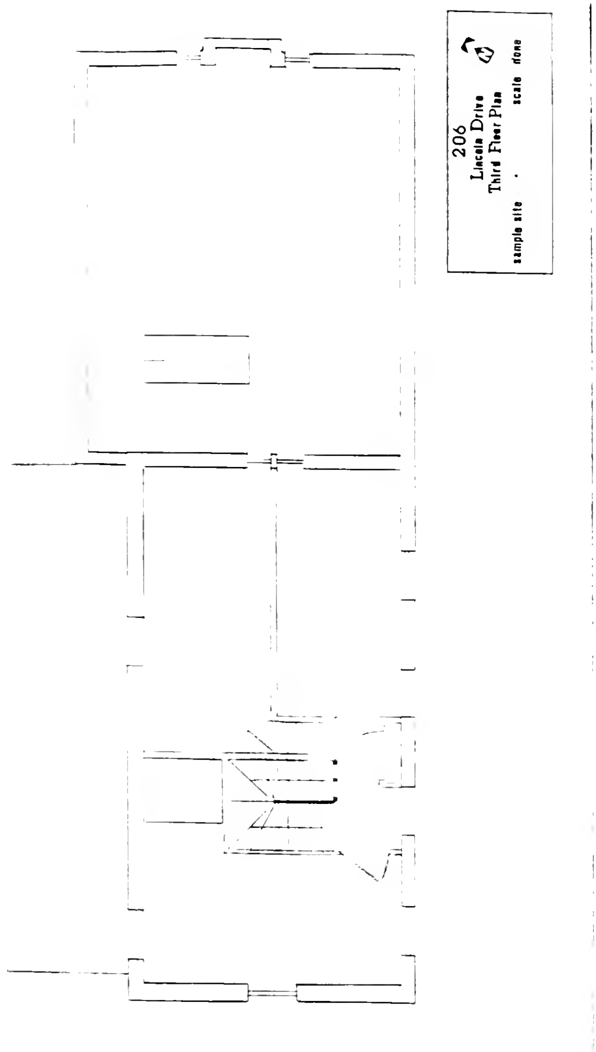
206
Lincoln Drive
Elevation

sample site •   scale 1/8 = 1'0"

West Face


206
Lincoln Drive
Floor Plan
sample site
scale none


206
Lincoln Drive
Floor Plan
sample site
scale none


206
Lincoln Drive
Third Floor Plan
sample site
scale none

Appendix #16

206 Lincoln Drive Chain of Title

From the Title Registry of the Department of Records,

Philadelphia City Hall, Philadelphia Pennsylvania

Chain of Title for 206 Lincoln Drive

The first seven transaction are contained in a Deed between William Rittenhouse on the one part and Jacob and Abraham Rittenhouse on the other. This deed was found in the Peter Rittenhouse envelope, Fairmount Park Commission Files. City Archives, City Hall Annex, Philadelphia Pa.

June 4, 1690	From William Harwood To Samuel Carpenter 20 acres part of a 100 acre tract of land	Cited in next deed

1690 Agreement between Samuel Carpenter on the one part and William Rittenhouse (First Generation) and others for ground rent of 20 acers of land for the next 990 years.

Cited in next deed

Feb. 9, 1705/6	From Samuel Carpenter To William Rittenhouse (1st gen.)	Cited in next Deed

Deeds 20 acres ,a paper mill and other improvements for 975 years with a ground rent of 5 shillings sterling payable on september 9th, of each year.

Feb. 12, 1705/6	From William Rittenhouse To Claus Rittenhouse	Cited next Deed

For three-1/4 parts of 20 acers of land, a paper mill and improvements. Subjected to a ground rent of 5 shillings a year payable on September 9th, of each year. To Samuel Carpenter. And one pepper Corn to William Rittenhouse per year.

1708	From William Rittenhouse To Clause Rittenhouse One-1/4 part of the above described lot.	Cited in next deed

William Rittenhouse dies intestate and Clause being the only son inherits the last portion of the 20 acres and paper mill.

May 24, 1734 — Will of Clause Rittenhouse — Will Book: E pg. 280
To William Rittenhouse (2nd. Gen.)
20 acers and Paoer mill

Nov, 21 1760 — From William Rittenhouse (2nd. Gen.) Paper maker
To Jacob and Abraham Rittenhouse, Paper makers
For the sum of 370 pounds sterling
18 acers containing a paper mill , and singular other mesuage tenement building,edifices improvements ways passages mill dams mill race head waters and other water course. Subjected to a yearly rent of 5 shillings sterling payable to Samuel Carpenter.

The above deed found in Peter Rittenhouse envelope in the Fairmount park commision files, City Archives.

March 1, 1785 — From Jacob Rittenhouse Paper Maker — Deed Book:D vol 23 pg.56
Abraham Rittenhouse, Miller
To William Rittenhouse (3rd. Gen.) Miller
For 1000 pounds silver or gold.

Three lots of ground. The first contianing 9 acres and stone messuage, part of the 18 acre lot that William Rittenhouse (2nd. Gen.) sold to Jacob and Abraham Rittenhouse. The second lot containing 4 and 1/2 acre and 192 perches. The third a ten acer lot with grist mill. The first lot is subjected to a ground rent of 3 pence per acre payable on the 29th day of september to Samual Carpenter.

Break in chain. — William Rittenhouse
Maybe to Henry Rittenhouse

Nov. 23. 1812 — From Henry Rittenhouse — Cited in next deed
To Daniel Rittenhouse and
Jacob Rittenhouse
Both have equal shares
Two lots

April 21, 1817 — From Jacob Rittenhouse — Cited in next Deed
To Daniel Rittenhouse
1/2 share of 2 lots

Sept. 24, 1851	From Daniel Rittenhouse To Johathan Rittenhouse Farmer 5 lots of land contianing 20 1/2 acres, Paid 4000 dollars	Deed Book: GWC. vol.122,pg 420

Lot # 3 has a ground rent of 3 pence per acre payable on September 29th of each year. Also an old paper mill on this same lot is excluded from the deed. This is the same property of 9 and 1/2 acres.

Jan. 11, 1881	Will of Jonathan Rittenhouse To Naomi Rittenhouse	Will Book:60 pg.219 #60 1881
March 1887	Will of Naomi Rittenhouse To William G. Foulke Last surviving Trustee	Will Book:142 pg. 549 #283, 1889
May 29, 1891	From William G. Foulke To William Umsted Paid One Dollar	Deed Book:TG. vol.60 pg.129
April 23, 1914	From William Umsted To Providence General Hospital	Deed Book: ELT vol.335pg.403
July 21, 1917	From Providence General Hospital To City of Philadelphia	Deed Book: JMH vol.252pg.127

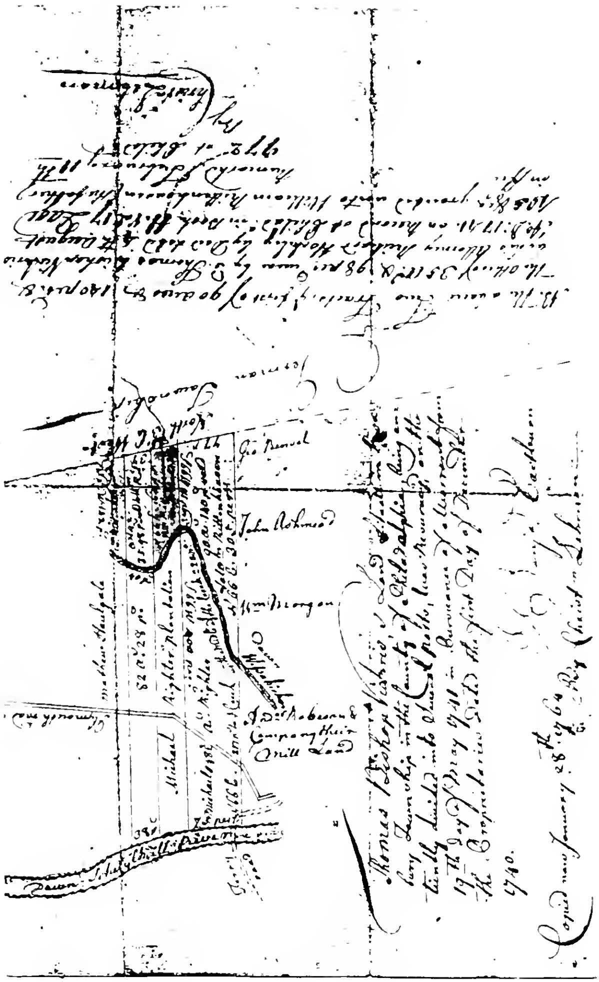
Appendix #17

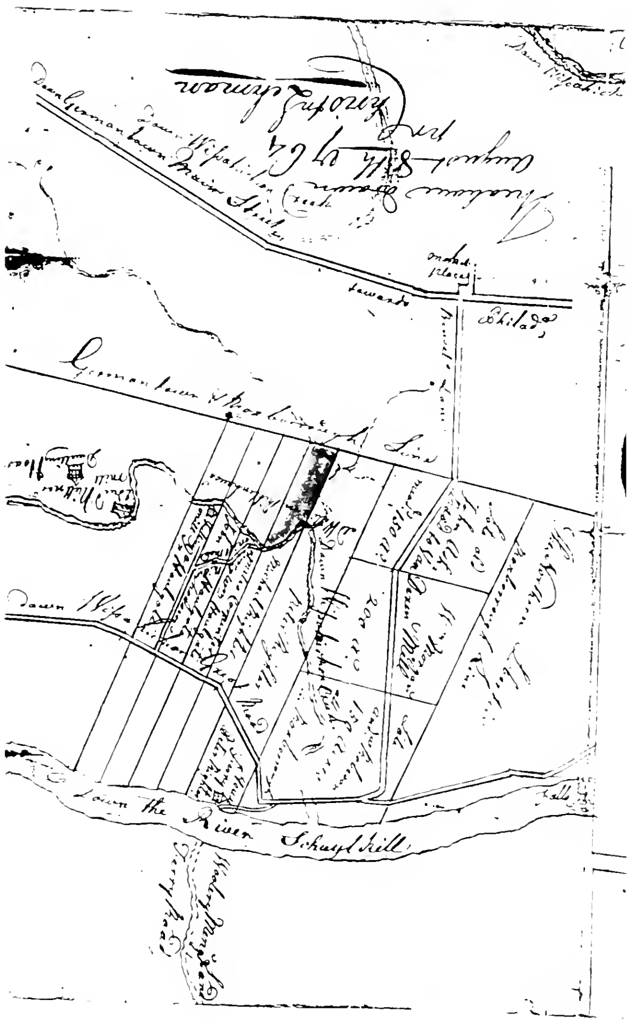
Christian Lehman Surveys

From the Christian Lehman Papers, Roxborough File.

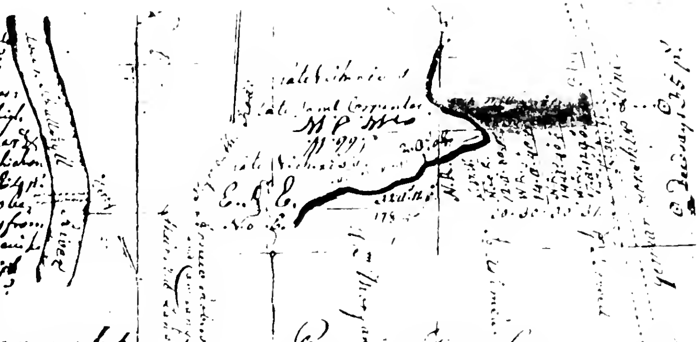
Manuscripts Department, Historical Society of Pennsylvania

Philadelphia Pennsylvania.


mathew Houlgate
82 a. 28 p.
Michael
Righter plantation
Wm Morgan
Company their Mill Land
Thomas Bishop Vickris's Land Situate in Roxbury Township in the County of Philadelphia being ... tirely divided into Several parts, was Resurveyed on the 19th day of May 1741 in Pursuance of a Warrant from the Proprietaries Dated the first Day of December 1740.
Copied now January 28th 1764
By Christn Lehman


Down the River Schuylkill
Germantown & Roxborough Line
towards
Philad.

of 2 A.s piece opposite Nich.s Rittenhouses mill. is by Nich.l Righter's Southwesterly 62 per.s to high Road. S E 5 1/2 per.s & up the middle of the said Road N E 55 p.s N N E 4 p.s & North 4 per.s to beg.g being 2 Acres from Nich.l Righter [illegible] Deed 24th April 1746 to Nich.s Rittenhouse



A Draught of Several Pieces of Land Situate in Roxborough Township in the County of Philad.a and belonging to Will.m and Nicholas Rittinghouse as the same are respectively above marked with the Letters N. R. and W. R. and of such respective Dimensions set forth in the above Draught

[illegible]

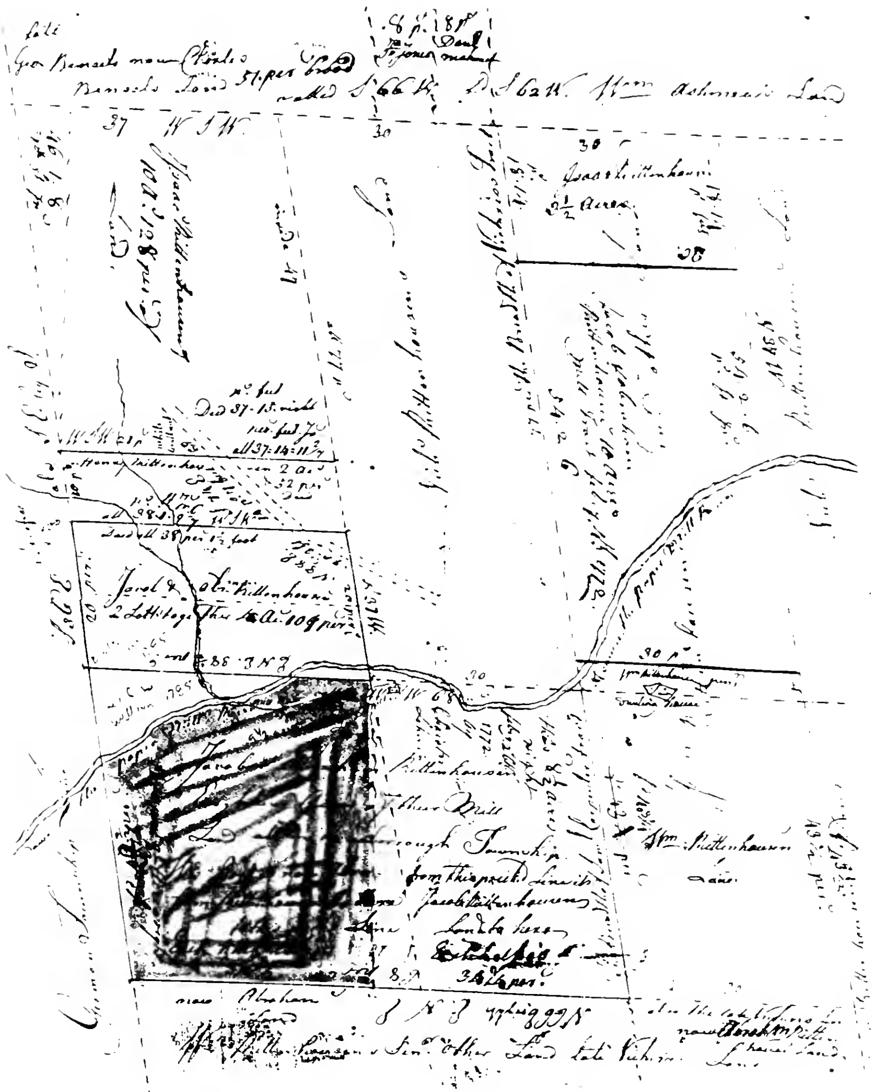
Germantown
April y.e 3d 1746

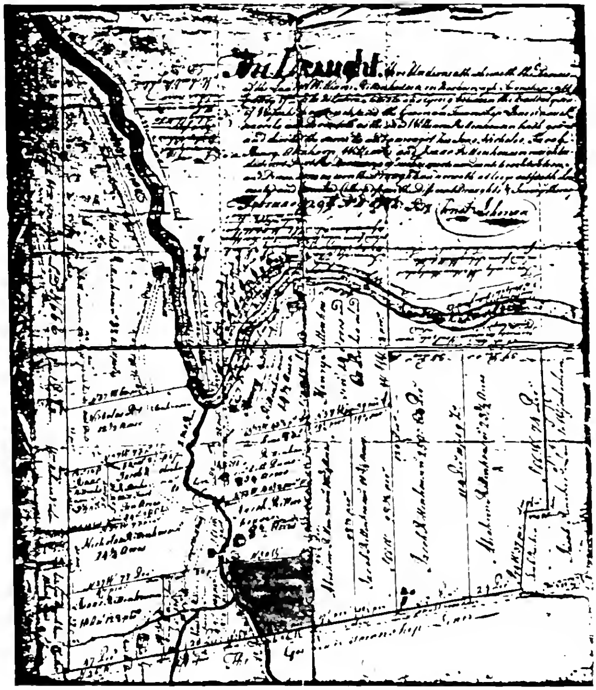
Christ.r Lehman

[illegible] 1764

Nich.s Rittenhouse [illegible] Deed of 8th June 1746 granted [illegible] 32 A 11 p.s [illegible] 80 [illegible] 14 1/2 [illegible] unto Nich.s Rittenhouse in fee [illegible] Hageman dated 2 July 1716 Rec.d B. H. Vol 12 page 206.

69





Draught of the Division of the Land of William Rittenhouse

Appendix #18

Will of Jonathan Rittenhouse, #63-1881; Register of Wills, City Hall Annex, Philadelphia Pennsylvania.

Inventory of Johathan Rittenhouse

By Robert Thomas and Howard W. Lloyd. Febuary 1881

Household Goods:

Clock	........................40.00
Cupboard	.... 5.00
Settee	.... 1.00
Dining Table and Chairs	.... 6.00
Kitchen Furniture and Cooking Utinsils	........10.00
Bedstead and Chamber Carpet	.... 5.00
Bureau	........................10.00
Stove	.... 2.00
Single Bedstead	.... 2.00
Entry Carpet and Oil Cloth	.... 5.00
Extention Table and Carpet	....

Contence of Barn:

Cow	........................40.00
Heiffer	........................36.00
Dearborn Harness	.... 6.00
Cart Gears	.... 5.00
Garden Tools	.... 1.50
Wheel Barrow	.... .75
Sleigh	.... 7.00
Bells	.... .50
Cart	........................20.00
Old Carriage	........................20.00
Hay and Straw	........................40.00
Ladder, Lot of Tools	........................10.00
Lead Pipe	.... 8.00
Patent Balance	.... 2.50
Chickens	.... 5.00
Premis on West Side Wissahickon Ave, Homestead, Tenïment Barn and other Buildings	620,00

Other Property listed.

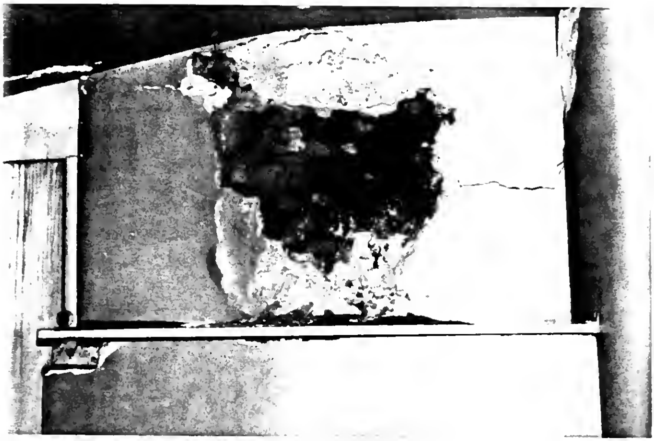
Will of Johathan Rittenhouse, #63-1881: Register of Wills,City Hall Annex, Philadelphia Pa.

Appendix #19

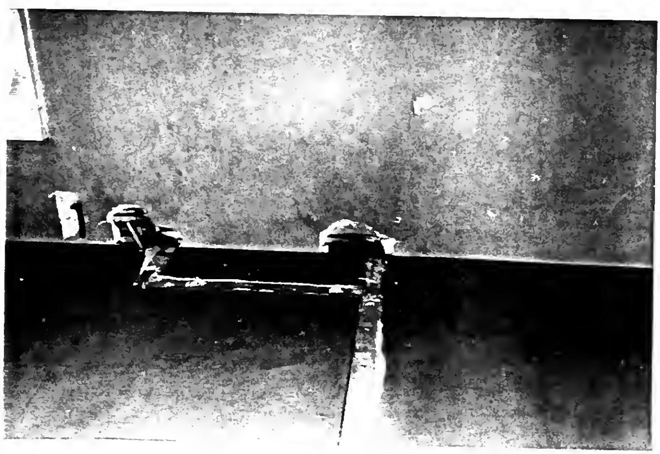
Water damage caused by roof leak.

Appendix #29
Rockland Paint Data Sheets

Third Floor West Room.
Water damage to the plaster surface on the
chimney stack.



Third-floor west room: evidence of the removal of an old
electrical system. The ceiling and walls were never repaired.

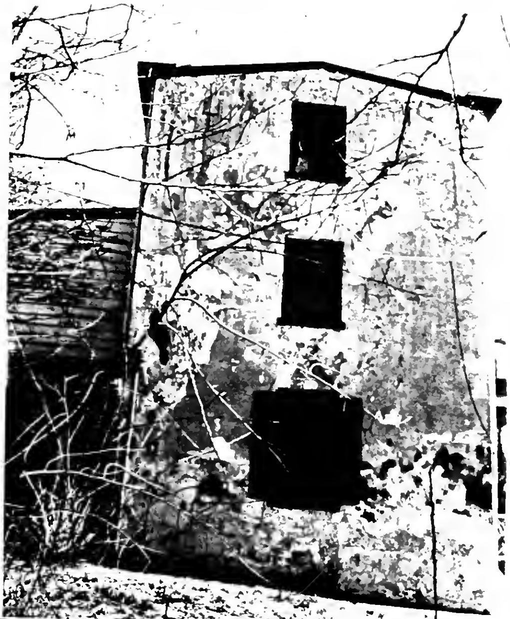


Appendix #20
Exterior Maintenance Problems

[illegible] Drive:

North and West Elevation

The paint is peeling on all surfaces and the porch ceiling is in poor condition.

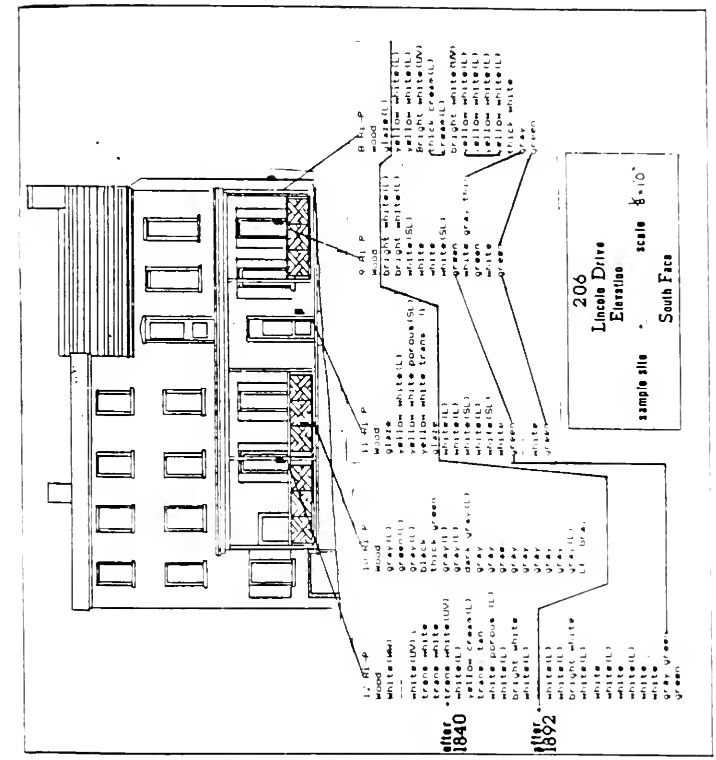


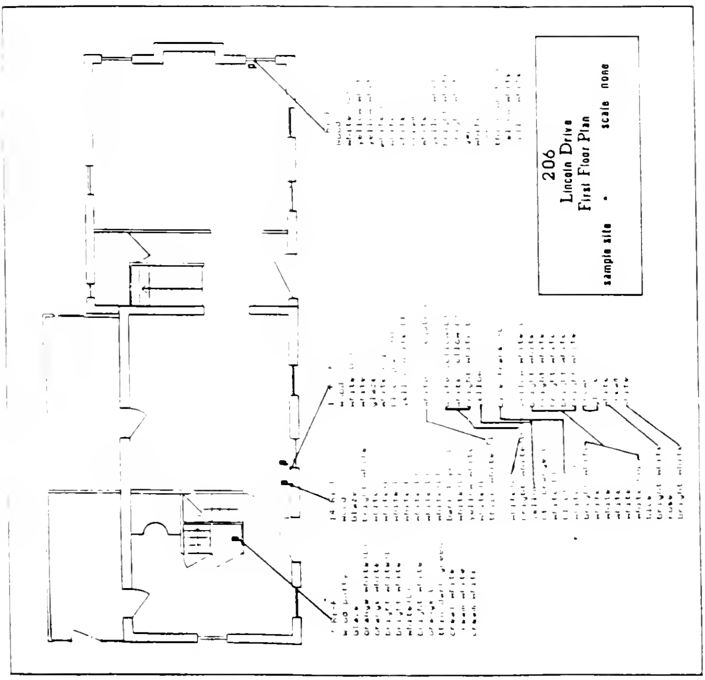
East Elevation

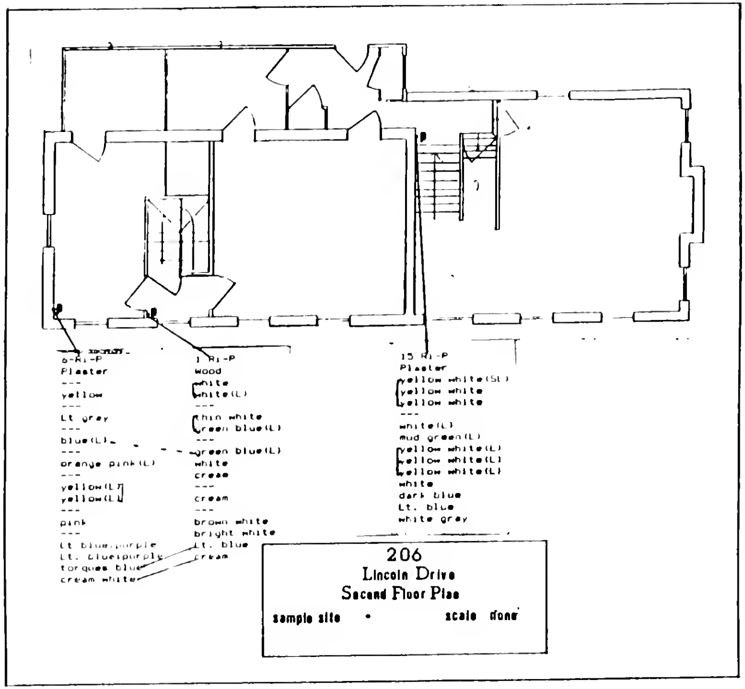
This is the newer Victorian addition but the same conditions still persist (peeling paint and stucco). The north elevation also shows the same problems

Appendix #21

206 Lincoln Drive Paint Sample Stratigraphy

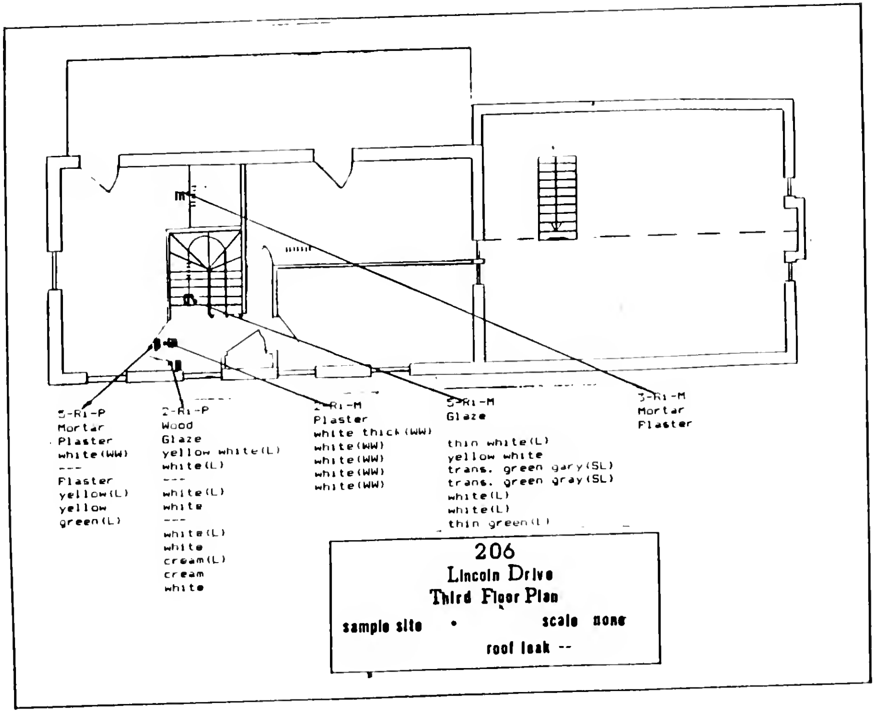

206
Lincoln Drive
Elevation
South Face
sample site
scale
after 1840
after 1892


206
Lincoln Drive
First Floor Plan
sample site •
scale none


6-Ri-P
Plaster
---
yellow

Lt grey
---
blue(L)
---
orange pink(L)
---
yellow(L)
yellow(L)
---
pink

Lt blue purple
Lt. bluepurple
torques blue
cream white
1 Ri-P
wood
white
white(L)
---
thin white
green blue(L)
---
green blue(L)
white
cream
---
cream
---
brown white
bright white
Lt. blue
cream
15 Ri-P
Plaster
yellow white(SL)
yellow white
yellow white
---
white(L)
mud green(L)
yellow white(L)
yellow white(L)
yellow white(L)
white
dark blue
Lt. blue
white grey
206
Lincoln Drive
Second Floor Plan
sample site
scale
done


5-Ri-P
Mortar
Plaster
white(WW)

Plaster
yellow(L)
yellow
green(L)
2-Ri-P
Wood
Glaze
yellow white(L)
white(L)
---
white(L)
white
---
white(L)
white
cream(L)
cream
white
1-Ri-M
Plaster
white thick(WW)
white(WW)
white(WW)
white(WW)
white(WW)
5-Ri-M
Glaze
thin white(L)
yellow white
trans. green gary(SL)
trans. green gray(SL)
white(L)
white(L)
thin green(L)
3-Ri-M
Mortar
Plaster
206
Lincoln Drive
Third Floor Plan
sample site •
scale none
roof leak --

Appendix #22

206 Lincoln Drive Paint Data Sheets

Phase I: Sequence of Layers 1-RI-P

Structure Kittehouse

Location of Sample Interior 2nd fl old section door jamb to west room

Date Removed March 1988 Removed By MT

Significant Facts Regarding The Structure's History Which May Pertain The To The Analysis (dateconstructed, significant alterations, dates painted)

DATA: Microscopic Analysis

CODES		Reaction of	
-Finish	(F)	Sodium Sulfide	(Na_2S)
Primer	(P)	Hydrochloric Acid	(HCl)
Glaze	(G)	Dimethylformamide	(DMF)
Varnish	(V)	Methylene Chloride	(CH_2CL_2)
Shellac	(S)	Water	(H_2O)
Wall paper	(W)	Alcohol	(OH)
Fracture	( )	Turentine	(TURP)
Dirt Layer	(-)	Neat UV Light	(UV)

Note layers of decorative painting, if any: (graining, marbleizing, polychromy ect.).

	Chromochronology	Comments
Substrate:	wood	
1.	white	
2.	white	NaS
3.	white-tbn	
4.	greenish blue	NaS
5.	Greenish blue	NaS
6.	white	
7.	cream	
8.	—	
9.	cream	
10.	—	
11.	Brown white	
12.	Bright white	
13.	—	
14.	Lt Blue	
15.	cream	

	Chromochronology	Comments
16.		
17.		
18.		
19.		
20.		
21.		
22.		
23.		
24.		
25.		
26.		
27.		
28.		
29.		
30.		

Summary:

Phase II: Analysis and Recommendations 1-R.-P
Structure ____________________
Location of Sample ____________________
Date Removed ____________________ Removed By ____________________

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis # 1

No. of Layers to be Studied #3
Reason for Layer Selection: ____________________
Visual Characteristics of Layer to be Matched: (relative thinness, thickness glassiness, ropiness, ect.): ____________________

MEDIUM ANALYSIS: (Separate paint/finishlayer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil	DmF	+
Latex		
Whitewash/calcimine		
Waterbased/distemper		
Varnish		
Shellac		

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes ___ no ✓, Color ____________________
Probable pigment associated with flourescence: ____________________

Possible Pigment Type	Spot Test	Reaction
#1 lead	#3	
lead	KI	yellow
HCl	—	no discoloration
Prussian Blue ~~Cobalt Blue~~	NaOH	NR

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): ____________________
Probable medium: ____________________

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if approprate.)

Butens paint color ____________ Sherwin-Williams ____________

RECOMMENDATIONS

Color: ____________________
Paint Type: ____________________

DOCUMENTATION
Sample/slide NO: ____________________
Report prepared - Date: ________ By Whom: ____________

Phase I: Sequence of Layers 2-R1-P
Structure Rittenhouse 206
Location of Sample Interior 3rd Fl South side from door jamb leading to Restroom
Date Removed ______ Removed By ______
Significant Facts Regarding The Structure's History Which May Pertain The To The Analysis (dateconstructed, significant alterations, dates painted)
addition

DATA: Microscopic Analysis

CODES		Reaction of	
-Finish	(F)	Sodium Sulfide	(Na_2S)
Primer	(P)	Hydrochloric Acid	(HCI)
Glaze	(G)	Dimethylformamide	(DMF)
Varnish	(V)	Methylene Chloride	(CH_2CL_2)
Shellac	(S)	Water	(H_2O)
Wall paper	(W)	Alcohol	(OH)
Fracture	( )	Turentine	(TURP)
Dirt Layer	(-)	Near UV Light	(UV)

Note layers of decorative painting, if any: (graining, marbleizing, polychromy ect.).

	Chromochronology	Comments			Chromochronology	Comments
Substrate:	Wood					
1.	G			16.		
2.	Yellow white	Na_2S	DMF	17.		
3.	White	Na_2S	Florescence	18.		
4.	—			19.		
5.	White	Na_2S Primer		20.		
6.	White			21.		
7.	—			22.		
8.	White	Na_2S Primer		23.		
9.	White			24.		
10.	Cream	Na_2S Primer		25.		
11.	Cream			26.		
12.	White			27.		
13.				28.		
14.				29.		
15.				30.		

Summary:

Phase II: Analysis and Recommendations 2 a -?

Structure ____________

Location of Sample ____________

Date Removed ____________ Removed By ____________

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis #1

No. of Layers to be Studied ____________

Reason for Layer Selection: ____________

Visual Characteristics of Layer to be Matched: (relative thinness, thickness glassiness, ropiness, ect.): ____________

MEDIUM ANALYSIS: (Separate paint/finishlayer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil	DMF	
Latex		
Whitewash/calcimine		
Waterbased/distemper		
Varnish		
Shellac		

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes ✓ no ___, Color yellow green

Probable pigment associated with flourescence: ____________

Possible Pigment Type	Spot Test	Reaction
#2 White lead	HNO_3	+
	KI	+
#3 Zinc Ox	$K_4Fe(CN)_6$	Blue grey color

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): Primer White lead in linseed oil

Probable medium: final coat Zinc in oil

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if approprate.)

Butens paint color ____________ Sherwin-Williams ____________

RECOMMENDATIONS

Color: ____________

Paint Type: ____________

DOCUMENTATION

Sample/slide NO: ____________

Report prepared - Date: ____________ By Whom: ____________

Phase I: Sequence of Layers 3- R.. P
Structure Rittenhouse
Location of Sample 1st floor SE Interior window E. wall
Date Removed March 88 Removed By MJ
Significant Facts Regarding The Structure's History Which May Pertain The To The Analysis (dateconstructed, significant alterations, dates painted)
Newer section of house c.1880

DATA: Microscopic Analysis

CODES		Reaction of	
-Finish	(F)	Sodium Sulfide	(Na_2S)
Primer	(P)	Hydrochloric Acid	(HCl)
Glaze	(G)	Dimethylformamide	(DMF)
Varnish	(V)	Methylene Chloride	(CH_2CL_2)
Shellac	(S)	Water	(H_2O)
Wall paper	(W)	Alcohol	(OH)
Fracture	( )	Turentine	(TURP)
Dirt Layer	(-)	Near UV Light	(UV)

Note layers of decorative painting, if any: (graining, marbleizing, polychromy ect.).

Chromochronology	Na_2S	Comments	CH_2Cl_2
Substrate: wood			
1. white		flowering	+
2. yellow white			+
3. yellow white			+
4. white	+		+
5. white			+
6. white			+
7. cream	+		+
8. white	slight		+
9. yellow wh.	+		+
10. bright white			-
11. bright white			DMF
12. split in paint			
13. white			DMF
14. thick white		flowering	DMF
15. yellow white			DMF

Chromochronology	Comments CH_2Cl_2
16. yellow white	+
17.	
18.	
19.	
20.	
21.	
22.	
23.	
24.	
25.	
26.	
27.	
28.	
29.	
30.	

Summary:

Phase II: Analysis and Recommendations 3-R-8
Structure
Location of Sample
Date Removed Removed By

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis #1 of zinc oxide aft. 1848

No. of Layers to be Studied
Reason for Layer Selection:
Visual Characteristics of Layer to be Matched: (relative thinness, thickness glassiness, ropiness, ect.):

MEDIUM ANALYSIS: (Separate paint/finishlayer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil	DMF	layers soften
Latex		
Whitewash/calcimine		
Waterbased/distemper		
Varnish		
Shellac		

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes ✓ no ___, Color yellow green
Probable pigment associated with flourescence: Zinc Ox

Possible Pigment Type	Spct Test	Reaction
Zinc ox	Zn	+
		+
		−

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): Zinc oxide
Probable medium: linseed oil

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if appropriate.)

Butens paint color Sherwin-Williams

RECOMMENDATIONS

Color:
Paint Type:

DOCUMENTATION
Sample/slide NO:
Report prepared - Date: By Whom:

4 - Ri - m

Phase I: Sequence of Layers

Structure Rittenhouse

Location of Sample ? Basement walls

Date Removed March 1988 Removed By MVJ

Significant Facts Regarding The Structure's History Which May Pertain The To The Analysis (dateconstructed, significant alterations, dates painted)

DATA: Microscopic Analysis

CODES		Reaction of	
-Finish	(F)	Sodium Sulfide	(Na_2S)
Primer	(P)	Hydrochloric Acid	(HCl)
Glaze	(G)	Dimethylformamide	(DMF)
Varnish	(V)	Methylene Chloride	(CH_2CL_2)
Shellac	(S)	Water	(H_2O)
Wall paper	(W)	Alcohol	(OH)
Fracture	( )	Turentine	(TURP)
Dirt Layer	(-)	Near UV Light	(UV)

Note layers of decorative painting, if any: (graining, marbleizing, polychromy ect.).

Substrate: Mortar

	Chromochronology	Comments		Chromochronology	Comments
1.	white - ropey	HCl	16.		
2.	white	HCl whitewash	17.		
3.	white	HCl whitewash	18.		
4.	white	HCl	19.		
5.			20.		
6.			21.		
7.			22.		
8.			23.		
9.			24.		
10.			25.		
11.			26.		
12.			27.		
13.			28.		
14.			29.		
15.			30.		

Summary: whitewash

Phase II: Analysis and Recommendations 4.a.-m
Structure______________
Location of Sample______________
Date Removed______________ Removed By______________

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis______________

No. of Layers to be Studied______________
Reason for Layer Selection:______________
Visual Characteristics of Layer to be Matched: (relative thinness, thickness glassiness, ropiness, ect.):______________

MEDIUM ANALYSIS: (Separate paint/finishlayer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil	______	______
Latex	______	______
Whitewash/calcimine	______	______
Waterbased/distemper	______	______
Varnish	______	______
Shellac	______	______
______	______	______
______	______	______
______	______	______

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes___no___, Color______________
Probable pigment associated with flourescence:______________

Possible Pigment Type	Spot Test	Reaction
______	______	______
______	______	______
______	______	______
______	______	______

PIGMENT AND MEDIUM TYPE:

Probable pigment(s):______________
Probable medium:______________

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if approprate.)

Butens paint color ______________ Sherwin-Williams ______________

RECOMMENDATIONS

Color:______________
Paint Type:______________

DOCUMENTATION
Sample/slide NO:______________
Report prepared - Date:__________ By Whom: ______________

Phase I: Sequence of Layers 5 – R1 – P / also mortar
Structure Rittenhouse
Location of Sample 2nd floor over stairs
Date Removed March '82 Removed By MJJ
Significant Facts Regarding The Structure's History Which May Pertain The To The Analysis (dateconstructed, significant alterations, dates painted)
Section added to original 2 1/2 Story Structure

DATA: Microscopic Analysis

CODES		Reaction of	
-Finish	(F)	Sodium Sulfide	(Na_2S)
Primer	(P)	Hydrochloric Acid	(HCI)
Glaze	(G)	Dimethylformamide	(DMF)
Varnish	(V)	Methylene Chloride	(CH_2CL_2)
Shellac	(S)	Water	(H_2O)
Wall paper	(W)	Alcohol	(OH)
Fracture	( )	Turentine	(TURP)
Dirt Laver	(-)	Near UV Light	(UV)

Note lavers of decorative painting, if any: (graining, marbleizing, polychromy ect.).

no reaction w/ CH_2Cl_2

Substrate: Mortar

	Chromochronology	Comments	
1.	Plaster		
2.	white	HCl	whitewash
3.	—		
4.	plaster		
5.	yellow	Na_2S	DMF
6.	yellow		
7.	green	Na_2S	DMF
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			

	Chromochronology	Comments
16.		
17.		
18.		
19.		
20.		
21.		
22.		
23.		
24.		
25.		
26.		
27.		
28.		
29.		
30.		

Summary:
Got a reaction w/ Potassium Ferrocyanide because it is on a mortar

Phase II: Analysis and Recommendations S R. -?
Structure Pitt.
Location of Sample 3rd fl body Stairs
Date Removed ______ Removed By ______

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis see what first white layers

No. of Layers to be Studied # 1
Reason for Layer Selection: ______
Visual Characteristics of Layer to be Matched: (relative thinness, thickness glassiness, ropiness, ect.): ______

MEDIUM ANALYSIS: (Separate paint/finishlayer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil		
Latex		
Whitewash/calcimine	HCl	+
Waterbased/distemper		
Varnish		
Shellac		

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes___ no___, Color ______
Probable pigment associated with flourescence: ______

Possible Pigment Type	Spot Test	Reaction
whiting	HCl	+
test for green inconclusive		

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): white wash
Probable medium: ______

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if approprate.)

Butens paint color ______ Sherwin-Williams ______

RECOMMENDATIONS

Color: ______
Paint Type: ______

DOCUMENTATION
Sample/slide NO: ______
Report prepared - Date: ______ By Whom: ______

Phase I: Sequence of Lavers G-(R)-P
Structure Rittenhouse
Location or Sample 2nd fl. west wall SW corner
Date Removed March 1988 Removed By MO
Significant Facts Regarding The Structure's History Which May Pertain The To The Analysis (dateconstructed, significant alterations, dates painted)

DATA: Microscopic Analysis

CODES		Reaction of	
-Finish	(F)	Sodium Sulfide	(Na_2S)
Primer	(P)	Hydrochloric Acid	(HCI)
Glaze	(G)	Dimethylformamide	(DMF)
Varnish	(V)	Methylene Chloride	(CH_2CL_2)
Shellac	(S)	Water	(H_2O)
Wall paper	(W)	Alcohol	(OH)
Fracture	( )	Turentine	(TURP)
Dirt Laver	(-)	Near UV Light	(UV)

Note lavers of decorative painting, if any: (graining, marbleizing, polychromy ect.).

Substrate: Plaster

	Chromochronology	Comments	
1.	—		
2.	yellow	Sand goose	DMF
3.	—		
4.	Lt. gray	Battleship gr.	DMF
5.	—		
6.	Blue	Na_2S	DMF
7.	—		
8.	orange Pink	Na_2S	DMF
9.			
10.	yellow	Na_2S	DMF
11.	yellow	Na_2S	DMF
12.	—		
13.	Pink		
14.	—		
15.	Lt blue - Purple		

	Chromochronology	Comments
16.	Lt Blue - Purple	DMF
17.	turquoise Blue	DMF
18.	cream white	
19.		
20.		
21.		
22.		
23.		
24.		
25.		
26.		
27.		
28.		
29.		
30.		

Summary:

Phase II: Analysis and Recommendations

Structure ______

Location of Sample ______

Date Removed ______ Removed By ______

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis ______

No. of Layers to be Studied ______

Reason for Layer Selection: ______

Visual Characteristics of Layer to be Matched: (relative thinness, thickness glassiness, ropiness, ect.): ______

MEDIUM ANALYSIS: (Separate paint/finishlayer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil	w/ DMF	softened
Latex		
Whitewash/calcimine		
Waterbased/distemper		
Varnish		
Shellac		

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes ___ no ___, Color ______

Probable pigment associated with flourescence: ______

Possible Pigment Type	Spot Test	Reaction
lead	K+	+

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): lead white

Probable medium: ______

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if approprate.)

Butens paint color Snow [illegible] ______ Sherwin-Williams ______

RECOMMENDATIONS

Color: ______

Paint Type: ______

DOCUMENTATION

Sample/slide NO: [illegible]

Report prepared - Date: 11 '25 By Whom: MJ

Phase I: Sequence of Layers # 7-R1-P
Structure 206 Rittenhouse
Location of Sample from kitchen door work opposite entrance
Date Removed March '85 Removed By MJ
Significant Facts Regarding The Structure's History Which May Pertain The To The Analysis (dateconstructed, significant alterations, dates painted)

DATA: Microscopic Analysis

CODES		Reaction of	
-Finish	(F)	Sodium Sulfide	(Na_2S)
Primer	(P)	Hydrochloric Acid	(HCl)
Glaze	(G)	Dimethylformamide	(DMF)
Varnish	(V)	Methylene Chloride	(CH_2CL_2)
Shellac	(S)	Water	(H_2O)
Wall paper	(W)	Alcohol	(OH)
Fracture	( )	Turentine	(TURP)
Dirt Layer	(-)	Near UV Light	(UV)

Note layers of decorative painting, if any: (graining, marbleizing, polychromy ect.).

Chromochronology	Comments	
Substrate: wood putty	Na_2S	DMF
1. Glaze-varnish		+
2. orange-white / orange-white	+	
3. orange-white		
4. bright white / partly	+	
5. Bright white		
6. Bright white / white	+	
7. Orange		+
8. Thin dark green		+
9. Cream white		+
10. cream white		+
11. cream white		+
12.		
13.		
14.		
15.		

Chromochronology	Comments
16.	
17.	
18.	
19.	
20.	
21.	
22.	
23.	
24.	
25.	
26.	
27.	
28.	
29.	
30.	

Summary:

Phase II: Analysis and Recommendations 7-R -P
Structure
Location of Sample
Date Removed Removed By

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis #/F2

No. of Layers to be Studied -/F2
Reason for Layer Selection:
Visual Characteristics of Layer to be Matched: (relative thinness, thickness glassiness, ropiness, ect.):

MEDIUM ANALYSIS: (Separate paint/finishlayer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil	IMF	softener layer
Latex		
Whitewash/calcimine		
Waterbased/distemper		
Varnish		
Shellac		

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes ___ no ✓, Color
Probable pigment associated with flourescence:

Possible Pigment Type	Spot Test	Reaction
lead	KI	yellow
chrom. yellow	silver nitrate	Red color

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): chrom yellow w/white lead
Probable medium: linseed oil

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if approprate.)

Butens paint color 6th 22 (w) ?Hand Butter Sherwin-Williams

RECOMMENDATIONS

Color:
Paint Type:

DOCUMENTATION
Sample/slide NO:
Report prepared - Date: By Whom:

Phase I: Sequence of Layers F - R. - P
Structure Pittsburgh 206
Location of Sample Shutter window lintel SE window east side
Date Removed March 88 Removed By MJ
Significant Facts Regarding The Structure's History Which May Pertain The To The Analysis (dateconstructed, significant alterations, dates painted)

DATA: Microscopic Analysis

CODES		Reaction of	
-Finish	(F)	Sodium Sulfide	(Na_2S)
Primer	(P)	Hydrochloric Acid	(HCl)
Glaze	(G)	Dimethylformamide	(DMF)
Varnish	(V)	Methylene Chloride	(CH_2CL_2)
Shellac	(S)	Water	(H_2O)
Wall paper	(W)	Alcohol	(OH)
Fracture	( )	Turentine	(TURP)
Dirt Layer	(-)	Near UV Light	(UV)

Note layers of decorative painting, if any: (graining, marbleizing, polychromy ect.).

Chromochronology		Comments
Substrate: Wood Na2S		
1. Glaze	+	
2. Yellow white	+	
3. Yellow	+	
4. Bright white	—	Line Gr
5. thick cream	+	
6. cream	+	Line Gr
7. bright white	—	
8. yellow white	+	
9. yellow white	+	
10. yellow white	+	
11. yellow white	+	
12. thick white	—	
13. [illegible]	—	
14. Green	—	
15.		

Chromochronology	Comments
16.	
17.	
18.	
19.	
20.	
21.	
22.	
23.	
24.	
25.	
26.	
27.	
28.	
29.	
30.	

Summary:

Phase II: Analysis and Recommendations 4 R-P
Structure ____________
Location of Sample ____________
Date Removed ____________ Removed By ____________

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis # 1, 2

No. of Layers to be Studied ____________
Reason for Layer Selection: ____________
Visual Characteristics of Layer to be Matched: (relative thinness, thickness glassiness, ropiness, ect.): ____________

MEDIUM ANALYSIS: (Separate paint/finishlayer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil	glaze DMF	Softens- dissolve
Latex	White DMF	soften
Whitewash/calcimine		
Waterbased/distemper		
Varnish		
Shellac		

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes____no____, Color ____________
Probable pigment associated with flourescence: ____________

Possible Pigment Type	Spot Test	Reaction
lead	Na_2S	turned black
	HCl	+
	KI	yellow resid

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): lead white
Probable medium: linseed oil

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if approprate.)

Butens paint color ____________ Sherwin-Williams ____________

RECOMMENDATIONS

Color: ____________
Paint Type: ____________

DOCUMENTATION
Sample/slide NO: ____________
Report prepared - Date: ____________ By Whom: ____________

Phase I: Sequence of Layers 9-Ki-P
Structure Rittenhouse
Location of Sample South face IE window lintel
Date Removed March 86 Removed By MT
Significant Facts Regarding The Structure's History Which May Pertain The To The Analysis (dateconstructed, significant alterations, dates painted)
Addition after 1810

DATA: Microscopic Analysis

CODES		Reaction of	
-Finish	(F)	Sodium Sulfide	(Na_2S)
Primer	(P)	Hydrochloric Acid	(HCl)
Glaze	(G)	Dimethylformamide	(DMF)
Varnish	(V)	Methylene Chloride	(CH_2CL_2)
Shellac	(S)	Water	(H_2O)
Wall paper	(W)	Alcohol	(OH)
Fracture	( )	Turentine	(TURP)
Dirt Layer	(-)	Near UV Light	(UV)

Note layers of decorative painting, if any: (graining, marbleizing, polychromy ect.).

Chromochronology Comments

Substrate: wood	Na_2S		HCl
1. white bright	+	+	+
2. white bright	+	+	
3. white	Slight		
4. white	−	+	
5. white	−	+	
6. white	Slight	+	
7. green		+	
8. white gray-v. thin		+	
9. green		+	
10. white		+	
11. green		+	
12.			
13.			
14.			
15.			

Chromochronology Comments

16.
17.
18.
19.
20.
21.
22.
23.
24.
25.
26.
27.
28.
29.
30.

Summary:
orig. color ~~#~~ was white w/ lead base

Phase II: Analysis and Recommendations
Structure 9-Ri-P
Location of Sample Rit. window South side SE window exterior
Date Removed Mar. 88 Removed By MV

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis Composition of 1st layer

No. of Layers to be Studied
Reason for Layer Selection:
Visual Characteristics of Layer to be Matched: (relative thinness, thickness glassiness, ropiness, ect.): all relatively similar thickness

MEDIUM ANALYSIS: (Separate paint/finishlayer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil	DMF	softened
Latex		
Whitewash/calcimine		
Waterbased/distemper		
Varnish		
Shellac		

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes___no___, Color___
Probable pigment associated with flourescence:

Possible Pigment Type	Spot Test	Reaction

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): lead white
Probable medium: linseed oil

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if approprate.)

Butens paint color ___ Sherwin-Williams ___

RECOMMENDATIONS

Color: titanium
Paint Type: linseed oil

DOCUMENTATION
Sample/slide NO: 9-Ri-P
Report prepared - Date: 11 19 By Whom: MJ

Phase I: Sequence of Layers 10-Ri-P
Structure Rittenhouse
Location of Sample Sample porch boards area of old section
Date Removed March 88 Removed By MJ
Significant Facts Regarding The Structure's History Which May Pertain The To The Analysis (dateconstructed, significant alterations, dates painted)
See if age of porch later than windows

DATA: Microscopic Analysis

CODES -Finish (F)
Primer (P)
Glaze (G)
Varnish (V)
Shellac (S)
Wall paper (W)
Fracture ( )
Dirt Layer (-)

Reaction of Sodium Sulfide (Na_2S)
Hydrochloric Acid (HCI)
Dimethylformamide (DMF)
Methylene Chloride (CH_2CL_2)
Water (H_2O)
Alcohol (OH)
Turentine (TURP)
Near UV Light (UV)

Note layers of decorative painting, if any: (graining, marbleizing, polychromy ect.).

Substrate: Wood

Chromochronology			Comments
1. Gray	+		
2. Green	+		
3. Gray	+		
4. Black	+		
5. thick green	–	+	
6. Gray	+	+	
7. Gray	+	+	
8. dark gray	+	+	
9. gray		+	
10. gray		+	
11. green		+	
12. gray		+	
13. gray		+	
14. gray		+	
15. gray		+	

Chromochronology	Comments	
16. Gray		l+
17. gray	Na_2S	+
18. lt gray		+
19.		
20.		
21.		
22.		
23.		
24.		
25.		
26.		
27.		
28.		
29.		
30.		

Summary:

Phase II: Analysis and Recommendations
Structure
Location of Sample
Date Removed   Removed By

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis Blue translucent = 1
Green #2

No. of Layers to be Studied
Reason for Layer Selection:
Visual Characteristics of Layer to be Matched: (relative thinness, thickness glassiness, ropiness, ect.):

MEDIUM ANALYSIS: (Separate paint/finishlayer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil		very slow reaction
Latex		
Whitewash/calcimine		
Waterbased/distemper		
Varnish		
Shellac		

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes___no___, Color
Probable pigment associated with flourescence:

	Possible Pigment Type	Spot Test	Reaction
Blue			
			paper turns yellow
Chrom Green	Prussian Blue		green turns brown
	Prussian Blue		brown → blue

PIGMENT AND MEDIUM TYPE:

Probable pigment(s):
Probable medium: linseed oil

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if approprate.)

Butens paint color   Sherwin-Williams

RECOMMENDATIONS

Color:
Paint Type:

DOCUMENTATION
Sample/slide NO: 13-R-P
Report prepared - Date: March CC By Whom: MF

Phase I: Sequence of Layers

Structure ______

Location of **Sample** ______

Date **Removed** ______ Removed By ______

Significant **Facts** Regarding The Structure's History Which May Pertain The To The **Analysis** (dateconstructed, significant alterations, dates painted)

DATA: Microscopic Analysis

CODES		Reaction of	
-Finish	(F)	Sodium Sulfide	(Na_2S)
Primer	(P)	Hydrochloric Acid	(HCl)
Glaze	(G)	Dimethylformamide	(DMF)
Varnish	(V)	Methylene Chloride	(CH_2CL_2)
Shellac	(S)	Water	(H_2O)
Wall paper	(W)	Alcohol	(OH)
Fracture	( )	Turentine	(TURP)
Dirt Layer	(-)	Near UV Light	(UV)

Note layers of decorative painting, if any: (graining, marbleizing, polychromy ect.).

Chromochronology	Comments	Chromochronology	Comments
Substrate:			
1.		16.	
2.		17.	
3.		18.	
4.		19.	
5.		20.	
6.		21.	
7.		22.	
8.		23.	
9.		24.	
10.		25.	
11.		26.	
12.		27.	
13.		28.	
14.		29.	
15.		30.	

Summary:

Phase II: Analysis and Recommendations

Structure ______________________

Location of Sample ______________________

Date Removed ______________________ Removed By ______________________

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis ______________________

No. of Layers to be Studied ______________________

Reason for Layer Selection: ______________________

Visual Characteristics of Layer to be Matched: (relative thinness, thickness glassiness, ropiness, ect.): ______________________

MEDIUM ANALYSIS: (Separate paint/finishlayer from stratigrapny, if necessary.)

Possible medium	Chemical	Reaction
Oil		
Latex		
Whitewash/calcimine		
Waterbased/distemper		
Varnish		
Shellac		

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes ____ no ✓, Color ______________________

Probable pigment associated with flourescence: ______________________

Possible Pigment Type	Spot Test	Reaction

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): ______________________

Probable medium: ______________________

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if approprate.)

Butens paint color ______________ Sherwin-Williams ______________

RECOMMENDATIONS

Color: ______________________

Paint Type: ______________________

DOCUMENTATION

Sample/slide NO: ______________________

Report prepared - Date: ______________ By Whom: ______________

Phase I: Sequence of Layers 12-P.-P

Structure [illegible] Kittenhouse

Location of Sample window lintel ex west end

Date Removed March 88 Removed By MJ

Significant Facts Regarding The Structure's History Which May Pertain The To The Analysis (dateconstructed, significant alterations, dates painted)

Older section of bldg. should have more layers than 11-K.-P. or [illegible]-P.-[illegible]

DATA: Microscopic Analysis

CODES		Reaction of	
-Finish	(F)	Sodium Sulfide	(Na_2S)
Primer	(P)	Hydrochloric Acid	(HCl)
Glaze	(G)	Dimethylformamide	(DMF)
Varnish	(V)	Methylene Chloride	(CH_2CL_2)
Shellac	(S)	Water	(H_2O)
Wall paper	(W)	Alcohol	(OH)
Fracture	( )	Turentine	(TURP)
Dirt Layer	(-)	Near UV Light	(UV)

Note layers of decorative painting, if any: (graining, marbleizing, polychromy ect.).

	Chromochronology	Comments	
Substrate:	wood		
1.	white		HCl
2.	~ -		
3.	white		UV yellow
4.	trans-white		
5.	trans-white		
6.	trans-white		Zinc ox
7.	white	Na_2S	
8.	yellow-cream	Na_2S	
9.	- tan-trans		
10.	white-[illegible]		
11.	white		
12.	bright white		
13.	white		
14.	-		
15.	white		

	Chromochronology	Comments	
	white	Na_2S	
16.	Bright white		
17.	white	Na_2S	
18.	white		
19.	white	Na_2S	
20.	white		
21.	white	Na_2S	
22.	white		
23.	white		
24.	gray green		
25.	green		
26.			
27.			
28.			
29.			
30.			

Summary:

Phase II: Analysis and Recommendations 12-21-??
Structure
Location of Sample
Date Removed Removed By

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis

No. of Layers to be Studied 1st 2nd layers
Reason for Layer Selection:
Visual Characteristics of Layer to be Matched: (relative thinness, thickness glassiness, ropiness, ect.):

MEDIUM ANALYSIS: (Separate paint/finishlayer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil		
Latex		
Whitewash/calcimine	HCl	+
Waterbased/distemper		
Varnish		
Shellac		

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes___no___, Color
Probable pigment associated with flourescence:

Possible Pigment Type	Spot Test	Reaction
Calcimine	3 NHO_3	formation of long needles
Zinc ox.		

PIGMENT AND MEDIUM TYPE:

Probable pigment(s):
Probable medium: White wash

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if approprate.)

Butens paint color White Sherwin-Williams

RECOMMENDATIONS

Color: Lime white wash
Paint Type:

DOCUMENTATION
Sample/slide NO:
Report prepared - Date: 12-21-?? By Whom:

Dinning Room moulding   Zinc oxide after 1948

Phase I: Sequence of Layers 13-a, -,p
Structure ___ Rittenhouse
Location of Sample Dinning Room moulding
Date Removed ________ Removed By ________
Significant Facts Regarding The Structure's History Which May Pertain The To The Analysis (dateconstructed, significant alterations, dates painted)
Built before 1760 altered 3 times paint sample taken from older section of the building.

DATA: Microscopic Analysis

CODES		Reaction of	
Finish	(F)	Sodium Sulfide	(Na_2S)
Primer	(P)	Hydrochloric Acid	(HCl)
Glaze	(G)	Dimethylformamide	(DMF)
Varnish	(V)	Methylene Chloride	(CH_2CL_2)
Shellac	(S)	Water	(H_2O)
Wall paper	(W)	Alcohol	(OH)
Fracture	( )	Turentine	(TURP)
Dirt Layer	(-)	Near UV Light	(UV)

Note layers of decorative painting, if any: (graining, marbleizing, polychromy ect.). ________

Substrate: wood

	Chromochronology	Comments
1.	white	DMF, UV
2.	white	
3.	✓	
4.	white	Repair
5.	✓	
6.	Blue Gray	UV
7.	Yellow White	Na_2S
8.	—	
9.	white/aggregat	Na_2S
10.	—	
11.	white yellow	Na_2S
12.	white yellow	Na_2S
13.	Bright white	
14.	—	Na_2S
15.	Yellow	CH_2Cl_2
16.	~~[illegible]~~	DMF
17.	Blue Transparent	Na_2S
18.	~~Yellow white~~ —	
19.	Yellow white	Na_2S
20.	Bright white	
21.	" "	
22.	"	
23.	"	
24.	"	
25.	Brown	
26.	"	
27.	white	
28.	cream	
29.	white	CH_2Cl_2
30.		

Summary:
UV florescence indicates Zinc oxide

Phase II: Analysis and Recommendations B-Ri-P
Structure Rittenhouse
Location of Sample First Floor Dinning Room
Date Removed April 1988 Removed By NVJ

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis To see if first layer is Zinc oxide

No. of Layers to be Studied #1
Reason for Layer Selection: if Zinc oxide window sill Date to the ~~1830~~ c 1848
Visual Characteristics of Layer to be Matched: (relative thinness, thickness glassiness, ropiness, ect.):

MEDIUM ANALYSIS: (Separate paint/finishlayer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil	DMF	+
Latex		
Whitewash/calcimine		
Waterbased/distemper		
Varnish		
Shellac		

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes ✓ no ___. Color Yellow green
Probable pigment associated with flourescence:

Possible Pigment Type	Spot Test	Reaction
Zinc oxide	Potassium ferrocyanide	Blue/color

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): Zinc oxide
Probable medium: Linseed oil Paint not older than 1830/window sill of that age

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if approprate.)

Butens paint color ________ Sherwin-Williams ________

RECOMMENDATIONS

Color:
Paint Type: Zinc oxide w/ Linseed oil

DOCUMENTATION
Sample/slide NO:
Report prepared - Date: ______ By Whom: ______

Phase I: Sequence of Layers
Structure — R, - P
Location of Sample Interior oak board dining room old section
Date Removed ____________ Removed By ____________
Significant Facts Regarding The Structure's History Which May Pertain The To The Analysis (dateconstructed, significant alterations, dates painted)

DATA: Microscopic Analysis

CODES		Reaction of	
-Finish	(F)	Sodium Sulfide	(Na_2S)
Primer	(P)	Hydrochloric Acid	(HCI)
Glaze	(G)	Dimethylformamide	(DMF)
Varnish	(V)	Methylene Chloride	(CH_2CL_2)
Shellac	(S)	Water	(H_2O)
Wall paper	(W)	Alcohol	(OH)
Fracture	(	Turentine	(TURP)
Dirt Layer	(-)	Near UV Light	(UV)

Note layers of decorative painting, if any: (graining, marbleizing, polychromy ect.).

Chromochronology	Na_2S	Comments: Fluoresce	DMF
Substrate: wood			
1. Glaze	—	—	
2. white - bright	—	+	
3. white	—	+	
4.	+		
5.	+		
6.	+		
7.	+		
8.	+		
9.	+		
10. Dark paint	—		
11. white	+		
12. yellow white	—		
13. white	+		✓
14. thick wh. layer [illegible]			HCl
15.			

very thin layers

Chromochronology	Na_2S	Comments: Fluoresce	
16. white	+		
17. bright wh.	—	+	+
18. yellow	—		+
19. lt orange	+		+
20. white	+		+
21. blue	slight		+
22. white	+		+
23. bright white	—		+
24. white	—		+
25. white	—		+
26. white	—		+
27. white	—		+
28. white	—	HCl	+
29. blue	—		+
30. br. white	—		+
31. Rose			
32. bright white			

Summary:

Phase II: Analysis and Recommendations 14-21-P
Structure
Location of Sample
Date Removed Removed By

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis 2 & 3 for zinc ox

No. of Layers to be Studied
Reason for Layer Selection:
Visual Characteristics of Layer to be Matched: (relative thinness, thickness glassiness, ropiness, ect.):

MEDIUM ANALYSIS: (Separate paint/finishlayer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil	DMF	+
Latex		
Whitewash/calcimine		
Waterbased/distemper		
Varnish		
Shellac		

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes ✓ no ___, Color yellow green
Probable pigment associated with flourescence:

Possible Pigment Type	Spot Test	Reaction
HNO_3 - no reaction		
+	for zinc ox	

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): Zinc oxide
Probable medium: linseed oil

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if appropriate.)

Butens paint color Sherwin-Williams

RECOMMENDATIONS

Color:
Paint Type:

DOCUMENTATION
Sample/slide NO:
Report prepared - Date: 3/20 By Whom: MJ

Phase I: Sequence of Layers 206 Ritten.
Structure 206 Rittenhouse Hallway Ri-15-P
Location of Sample
Date Removed Removed By
Significant Facts Regarding The Structure's History Which May Pertain The To The Analysis (dateconstructed, significant alterations, dates painted)
exterior of new section

DATA: Microscopic Analysis

CODES -Finish (F)
Primer (P)
Glaze (G)
Varnish (V)
Shellac (S)
Wall paper (W)
Fracture ( )
Dirt Layer (-)

Reaction of Sodium Sulfide (Na_2S)
Hydrochloric Acid (HCI)
Dimethylformamide (DMF)
Methylene Chloride (CH_2CL_2)
Water (H_2O)
Alcohol (OH)
Turentine (TURP)
Near UV Light (UV)

Note layers of decorative painting, if any: (graining, marbleizing, polychromy ect.).

	Chromochronology	Comments	HCl	CH_2Cl_2	DMF
	Substrate:				
13	~~1~~. white gray		–	+	+
12	~~2~~. Lt blue		–		+
11	~~3~~. dark blue		–		+
10	~~4~~. white		–		+
9	~~5~~. yellow white	Na2S	–		+
8	~~6~~. yellow white	Na2S	–		+
7	~~7~~. yellow white	Na2S	–		+
6	~~8~~. mus green	Na2S	–		+
5	~~9~~. white	Na2S	–		+
4	~~10~~. black line	Na2S	–		+
3	~~11~~. yellow white		–		+
2	~~12~~. Yellow white		–		+
1	~~13~~. Yellow white	Na2S slight	–		+
	14.				+
	15. Plaster				

Chromochronology	Comments
16.	
17.	
18.	
19.	
20.	
21.	
22.	
23.	
24.	
25.	
26.	
27.	
28.	
29.	
30.	

Summary:

Phase II: Analysis and Recommendations 4-15 R
Structure ____________
Location of Sample ____________
Date Removed ____________ Removed By ____________

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis ____________

No. of Layers to be Studied ____________
Reason for Layer Selection: ____________
Visual Characteristics of Layer to be Matched: (relative thinness, thickness glassiness, ropiness, ect.): ____________

MEDIUM ANALYSIS: (Separate paint/finishlayer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil		
Latex		
Whitewash/calcimine		
Waterbased/distemper		
Varnish		
Shellac		

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes ___ no ✓, Color ____________
Probable pigment associated with flourescence: ____________

Possible Pigment Type	Spot Test	Reaction
lead	pottasium Iodide	+ yellow color
chrom yellow	silver nitrate	—
Naple yellow	tint silver	—
pigment marble		?

PIGMENT AND MEDIUM TYPE: No positive reaction w/any of the white pigment

Probable pigment(s): ?
Probable medium: oil or latex

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if approprate.)

Butens paint color ____________ Sherwin-Williams ____________

RECOMMENDATIONS

Color: ____________
Paint Type: ____________

DOCUMENTATION
Sample/slide NO: ____________
Report prepared - Date: ________ By Whom: ____________

Phase I: Sequence of Layers 3 – R1 – m
Structure 231 R
Location of Sample [illegible] Façade near H_2O damage
Date Removed March [illegible] Removed By mv
Significant Facts Regarding The Structure's History which May Pertain The To The Analysis (dateconstructed, significant alterations, dates painted)

DATA: Microscopic Analysis

CODES		Reaction of	
-Finish	(F)	Sodium Sulfide	(Na_2S)
Primer	(P)	Hydrochloric Acid	(HCl)
Glaze	(G)	Dimethylformamide	(DMF)
Varnish	(V)	Methylene Chloride	(CH_2Cl_2)
Shellac	(S)	Water	(H_2O)
Wall paper	(W)	Alcohol	(OH)
Fracture	( )	Turentine	(TURP)
Dirt Layer	(–)	Near UV Light	(UV)

Note layers of decorative painting, if any: (graining, marbleizing, polychromy ect.).

Chromochronology Comments
Substrate: Mortar
1. [illegible]
2.
3. whole sample contaminated
4. with iron leached from mortar
5. from water damage
6.
7.
8.
9.
10.
11.
12.
13.
14.
15.

Chromochronology Comments
16.
17.
18.
19.
20.
21.
22.
23.
24.
25.
26.
27.
28.
29.
30.

Summary:
Sample contaminated w/ salts

Phase II: Analysis and Recommendations 3 · R. · m
Structure ______________________
Location of Sample ______________________
Date Removed ______________________ Removed By ______________________

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis ______________________

No. of Layers to be Studied ______________________
Reason for Layer Selection: ______________________
Visual Characteristics of Layer to be Matched: (relative thinness, thickness glassiness, ropiness, ect.): ______________________

MEDIUM ANALYSIS: (Separate paint/finishlayer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil		
Latex		
Whitewash/calcimine		
Waterbased/distemper		
Varnish		
Shellac		

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes____ no____, Color ______________________
Probable pigment associated with flourescence: ______________________

Possible Pigment Type	Spot Test	Reaction

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): ______________________
Probable medium: ______________________

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if approprate.)

Butens paint color ______________ Sherwin-Williams ______________

RECOMMENDATIONS

Color: ______________________
Paint Type: ______________________

DOCUMENTATION
Sample/slide NO: ______________________
Report prepared - Date: __________ By Whom: ______________________

Phase I: Sequence of Layers 5-R.-m
Structure Rittenhouse 206
Location of Sample sample above stairs on third floor
Date Removed March Removed By MVJ
Significant Facts Regarding The Structure's History Which May Pertain The To The Analysis (dateconstructed, significant alterations, dates painted)
3

DATA: Microscopic Analysis

CODES		Reaction of	
-Finish	(F)	Sodium Sulfide	(Na_2S)
Primer	(P)	Hydrochloric Acid	(HCl)
Glaze	(G)	Dimethylformamide	(DMF)
Varnish	(V)	Methylene Chloride	(CH_2CL_2)
Shellac	(S)	Water	(H_2O)
Wall paper	(W)	Alcohol	(OH)
Fracture	( )	Turentine	(TURP)
Dirt Layer	(-)	Near UV Light	(UV)

Note layers of decorative painting, if any: (graining, marbleizing, polychromy ect.).

	Chromochronology	Comments
Substrate:	Plaster	Na_2S
1.	G ~~white~~	
2.	Primer ~~yellow white~~	
3.	~~transparent gray green~~	slight
4.	~~transparent gray green~~	slight
5.	~~white~~	+
6.	~~white~~	+
7.	~~very thin green~~	+
8.		
9.		
10.		
11.		
12.		
13.		
14.		
15.		

	Chromochronology	Comments
16.		
17.		
18.		
19.		
20.		
21.		
22.		
23.		
24.		
25.		
26.		
27.		
28.		
29.		
30.		

Summary:

Phase II: Analysis and Recommendations S-a-m
Structure
Location of Sample
Date Removed   Removed By

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis #3

No. of Layers to be Studied
Reason for Layer Selection:
Visual Characteristics of Layer to be Matched: (relative thinness, thickness glassiness, ropiness, ect.):

MEDIUM ANALYSIS: (Separate paint/finishlayer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil	DMF	—
Latex		
Whitewash/calcimine		
Waterbased/distemper		
Varnish		
Shellac		

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes ___ no ✓, Color
Probable pigment associated with flourescence:

Possible Pigment Type	Spot Test	Reaction
lead	KI	yellow color
either naples yellow or litharge		
no reaction for chrom yellow		

PIGMENT AND MEDIUM TYPE:

Probable pigment(s):
Probable medium:

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if approprate.)

Butens paint color camille 13+h 9(W) Sherwin-Williams
The paint may have yellowed over time
RECOMMENDATIONS

Color:
Paint Type:

DOCUMENTATION
Sample/slide NO:
Report prepared - Date: By Whom:

Phase I: Sequence of Layers 2-Ri-m
Structure 206 Rittenhouse
Location of Sample Interior, sample above door to west room 3rd floor
Date Removed March 88 Removed By
Significant Facts Regarding The Structure's History Which May Pertain The To The Analysis (dateconstructed, significant alterations, dates painted)
Addition after original construction

DATA: Microscopic Analysis

CODES -Finish (F)
Primer (P)
Glaze (G)
Varnish (V)
Shellac (S)
Wall paper (W)
Fracture ( )
Dirt Layer (-)

Reaction of Sodium Sulfide : (Na_2S)
Hydrochloric Acid (HCl)
Dimethylformamide (DMF)
Methylene Chloride (CH_2CL_2)
Water (H_2O)
Alcohol (OH)
Turentine (TURP)
Near UV Light (UV)

Note layers of decorative painting, if any: (graining, marbleizing, polychromy ect.).

Chromochronology		Na_2S	HNO_3
Substrate:	Plaster		
1.	Thick white	—	+
2.	white	—	+
3.	white	—	+
4.	white	—	+
5.	white	—	+
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			

Comments

Chromochronology	Comments
16.	
17.	
18.	
19.	
20.	
21.	
22.	
23.	
24.	
25.	
26.	
27.	
28.	
29.	
30.	

Summary:

Phase II: Analysis and Recommendations 2-R.-P

Structure

Location of Sample

Date Removed Removed By

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis to see if white wash

No. of Layers to be Studied all

Reason for Layer Selection:

Visual Characteristics of Layer to be Matched: (relative thinness, thickness glassiness, ropiness, ect.):

MEDIUM ANALYSIS: (Separate paint/finishlayer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil		
Latex		
Whitewash/calcimine	HCl	+
Waterbased/distemper		
Varnish		
Shellac		

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes___no ✓. Color

Probable pigment associated with flourescence:

Possible Pigment Type	Spot Test	Reaction
lead	Na_2S	–
whiting	HCl	+ evolution of gas
	H_2SO_4	formation of $CaSO_4$ crystals

PIGMENT AND MEDIUM TYPE:

Probable pigment(s):

Probable medium:

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if approprate.)

Butens paint color Sherwin-Williams

RECOMMENDATIONS

Color:

Paint Type:

DOCUMENTATION

Sample/slide NO:

Report prepared - Date: By Whom:

Appendix #22

206 Lincoln Drive Mortar Data Sheets

ex. 21 (continued)

MORTAR ANALYSIS: DATA SHEET

Name ______ Sample No. 1-Ri-m 206

Date ______ Origin of sample Rittenhouse Exterior south face Victorian Add. white (cor ystuco)

Visual description of sample (color, texture, hardness, inclusions, etc.): White w/ aggregt

Mortar Analysis :

Original weight of powdered sample (W_1) = 19.98

Weight of filter paper (W_2) = .52 + .53 + .53 = 6.88

Weight of filter paper + dry fines (W_3) = 8.77

Weight of dry fines (W_3 - W_2) = 1.89 g

Weight of dry sand (W_4) = 3.55 g

% of sand ((W_4/W_1) x 100) = 17.76%

% of fines ((W_3 - W_2)/W_1 x 100) = 9.45%

% of dissolved binder = 72.79%

Observations: dissolution of binder, color of liquid: ______

Characterization of Sand:

Microscopic Examination

% Finer than 4.75 mm
2.36 mm 6.15
1.18 mm 29.15
600 um 32.5
300 um
150 um
75 um 1.70%
53 um
38 um

3.53

ex. 21 (continued)

MORTAR ANALYSIS: DATA SHEET stucco

Name ______________________ Sample No. 2-Ri-m

Date ______________________ Origin of sample 206 Rittenhouse Interior, plaster, from 3rd floor above entrance door.

Visual description of sample (color, texture, hardness, inclusions, etc.): White w/ fiber very sm. aggregates soft. Iron fragments

---

Mortar Analysis :

Original weight of powdered sample (W_1) =	25.06
Weight of filter paper (W_2) =	5.77 + .56 = 6.33
Weight of filter paper + dry fines (W_3) =	7.72 g
Weight of dry fines (W_3 - W_2) =	1.39 g
Weight of dry sand (W_4) =	16.80
% of sand ((W_4/W_1) x 100) =	67.03%
% of fines ((W_3 - W_2)/W_1 x 100) =	5.54%
% of dissolved binder =	27.43%

Observations: dissolution of binder, color of liquid: ______

Lime Green color

16.79

Characterization of Sand:

Microscopic Examination

% Finer than		
4.75 mm	—	
2.36 mm	.63	3.7[illegible]
1.18 mm	[illegible]	14.78%
600 um	[illegible]	[illegible]
300 um	[illegible] 97	[illegible]
150 um	[illegible] 74	22.34[illegible]
75 um	[illegible]	[illegible]
53 um	[illegible] 37	
38 um		

[illegible]

ex. 21 (continued)

MORTAR ANALYSIS: DATA SHEET 206 Rittenhouse

Name________________ Sample No. 3-Ri-m

Date________________ Origin of sample 206 Rittenhouse Interior, mortar & plaster from chimney

Visual description of sample (color, texture, hardness, inclusions, etc.): Very soft Iron Brown, w/ lime chunks

Iron fragments - alot

Liquid ~~Blood~~ Burgandy Red

Mortar Analysis :

Original weight of powdered sample (W_1) = 25.02

Weight of filter paper (W_2) = 5.91 + .56 6.47 g.

Weight of filter paper + dry fines (W_3) = 8.20 g.

Weight of dry fines ($W_3 - W_2$) = 1.73 g

Weight of dry sand (W_4) = 16.37 g

% of sand ((W_4/W_1) x 100) = 65.42%

% of fines (($W_3 - W_2$)/W_1 x 100) = 6.91%

% of dissolved binder = 27.67%

Observations: dissolution of binder, color of liquid: Liquid Burgandy Red

Characterization of Sand:

16.37

Microscopic Examination

% Finer than			
4.75	mm	—	
2.36	mm	1.22	9.73 %
1.18	mm	2.30	14.25 %
600	um	3.27	[illegible]
300	um	4.72	29 %
150	um	3.77	23.26 %
75	um	.73	4.32 %
53	um	.14	
38	um		

1.46 16.14

ex. 21 (continued)

MORTAR ANALYSIS: DATA SHEET

Name________________ Sample No. 4-Ri-m

Date________________ Origin of sample Rittenhouse 206 Interior, mortar sample, west side of Basement wall

Visual description of sample (color, texture, hardness, inclusions, etc.): Hard, white. Agg of various size Surface has been white washed no lime chunks

Mortar Analysis :

Original weight of powdered sample (W_1) =	25.05
Weight of filter paper (W_2) =	5.89 + .55 = 6.44
Weight of filter paper + dry fines (W_3) =	8.14 g
Weight of dry fines ($W_3 - W_2$) =	1.70 gr
Weight of dry sand (W_4) =	16.08 gr
% of sand ((W_4/W_1) x 100) =	64.19 %
% of fines (($W_3 - W_2)/W_1$ x 100) =	6.78 %
% of dissolved binder =	~~70.9~~ 29.03 %

Observations: dissolution of binder, color of liquid: Yellow liquid

16.08

Characterization of Sand:

Microscopic Examination

% Finer than
4.75 mm
2.36 mm 4
1.18 mm
600 um
300 um
150 um
75 um
53 um
38 um

Appendix #24

Rockland Chain of Title

Form the Title Registry of the Department of Records, Philadelphia City Hall, Philadelphia, Pennsylvania.

Chain of Title for Rockland

Nov. 25. 1677 — Recited in Patent

Warrant of Survey from the Court of Upland to William Orion for 100 Acres.

Feb. 9. 1680 — Recited in Patent

Surveyed to William Orion. 100 acres.
Second lot of land also included in the patent containing 60 acres.

Feb. 10. 1682	From William Orion To Dennis Rotchford 100 acres	Recorded: Feb. 2. 1693-4 Deed Book: A.pg. 11
Feb. 10. 1682	From William Orion To Dennis Rotchford 60 acres	Recorded: Feb. 10. 1693-4 Deed Book: A pg.51

Feb. 16. 1693-4 — Record Book: F No. 6. pg. 51. 52.

Patent: William Penn by his commissioners To Mary Rotchford widow of Dennis Rotchford and his administration for the above 100 acres and 60 acres and also another 40 acres adjoining the former of liberty land laid out 20th of 1st. month 1683 by a warrant from the proprietary dated the same day unto Dennis Rotchford to beholder as of the Manor of Springetsbury.

March 1. 1693-4	From Mary Rotchford To Thomas Shute 200 acres	Recorded: 3.1. 11. 1694 Land Office of Pennsylvania Record Book: F pg. 57.58.59
Sept. 11. 1707	Release: Heriot Rotchford To Thomas Shute	Recorded: August 13. 1707 Deed Book: E.3 vol.6. pg. 243
Aug. 4. 1745	Will of Thomas Shute To his son Joseph Shute	Proved: Dec. 10. 1748 Will Book: I pg. 5

Nov. 2. 1754	From Edward Warner et. all Trustees of Thomas Shute Joseph Shute did not pay 900 pounds currency rents. To Abel James 200 acres	Recorded: March 2. 1760 Deed Book: H No. 1 .pg.299
June 29. 1756	From Abel James To Joseph Shute 200 acres	Recorded: Feb. 26, 1760 Deed Book: H No.10.pg.296
July 22. 1756	From Joseph Shute To John Lawrence 26 Acres part of the original 200 acres	Recorded: June 26, 1779 Deed Book: I No.17.pg.69
July 24. 1765	From John Lawrence To John McPherson 26 Acres	Recorded: Dec. 1769 Deed Book: I Vol.6.pg.514
May 21. 1776	Mortgage John McPherson To Thomas Mason on the 26 acres	Recorded: Aug. 10, 1776 Mortgage Book:X No.20.pg.82

To secure the payment of 921 pounds with interest

In 1802 the property is in dispute between Mary Ann McPherson Administrator of John McPherson s Estate. Vs. John Mason Thomas Paul Executors of Thomas Mason Deceased. Awarded to John Mason and Thomas Paul.

March 6. 1805	Deed Poll John Baker:High Sheriff To John Mason and Thomas Paul Awarded the 26 acres.	Supreme Court Book: 2.pg.16
May 1, 1809	From John Mason and Thomas Paul To George Thomas 26 acres	Recorded:June 26.1809 Deed Book: IC No.2.pg.164
Sept 12, 1815	From George Thomas To Isaac C Jones Paid 25... Dollars	Recorded: Oct. 12, 1815 Deed Book: MR No.4.pg.245

Certain Messuage or Tenement and tract or piece of land...Containing 26 acres. This is the first time the building

is mentioned.

Oct 22, 1828 Mortgage
To Isaac Jones
From Thomas Firth

Recorde Oct.
25, 1828
Mortgage Book:
GWR.No.11.pg.640

Satisfied December 27, 1834

Nov. 7, 1828 Deed of Trust
From Isaac C Jones
To John Carpenter and
Thomas Firth

Recorded: Nov.
11, 1828
Deed Book:
GWR.No.25.pg.298

Jan. 2 . 1834 Deed Endorsed:
From Thomas Frith
To Isaac C Jones

Recorded: Jan.
25, 1835
Deed Book: AM.
No.4.pg.478

Sept. 22, 1865 Will of Isaac C. Jones

Will Book:
54.pg.396

Appointed both Samuel Jones and Isaac Jones his executors and stated that they should sell all or part of his real estate.

From 1867 on the city of Philadelphia was in the process of buying this land from Isaac Jones Executor of Isaac C. Jones Estate.

March 19, 187[illegible] Deed Full Release Isaac Jones Executor of Isaac C. Jones estate to the City of Philadelphia.

Deed Book:
[illegible]. pg.

From: A Brief of Title to Rockland containing 26 acres. Estate of Isaac C. Jones. Fairmount Park Commission files. Box A-2000. City Archives, City Hall Annex. Philadelphia Pa.

Appendix #25

Inventory of Issac Jones

From the will of Issac Jones #52. 1863. Register of Wills. City Hall Annex. Philadelphia Pa.

Inventory of Issac Jones

Dobble Bedstead and Bedding		15.00
Single " "		10.00
Table with Drawers		3.00
Chairs	0.25 each	1.25
Odd Chairs and Bedstead		3.00
Air Tight Stove and Front		4.00
Lot of Worn Matting and Sundrys		3.00
Bedstead and Bedding		5.00
Bureau, Table, and 3 Chairs		5.00
Bureau,and Book Case		12.00
3-Moh hair Seat Chairs	1.50 each	4.50
Small Wood Chair		.50
Small Bedstead and Bedding		15.00
Large " "		25.00
Looking Glass		2.00
Sheet Iron Stove		1.50
Wash Table		2.00
Chamber Set		6.00
Carpet		5.00
Single Bedstead and Bedding		15.00
Case of Drawers		10.00
5 Chairs	0.25 each	1.25
Wash Stand		.50
Bureau		5.00
Table Stand		1.00
Chamber Chair		2.00
Small Looking Glass		1.00
Carpet		5.00
Chest of Drawers		15.00
Wardrobe and Table with Drawers		10.00
Single Bedstead and Bedding		12.00
" " "		20.00
	Subtotal	220.50
Looking Glass		2.00
Table With Drawers		3.00
Candle Stand Table		1.00
6 Yellow Chairs	0.25 each	1.50
Carpet		2.00
2 Large Bureaus	10.00 each	20.00
7 Hair Seat Chairs	1.50 each	10.50
Rocking Chair, Large		2.00
" " , Small		.50
Wash Stand and Furniture		5.00
Cain Seated Chair		1.00
Cain Backed Chair		1.00
Bedstead and Bedding		40.00
Dressing Table with Glass		10.00
Large Wardrobe		20.00
Small Bedstead and Bedding		17.00
1 Stove		5.00
1 Card Table		5.00
1 Carpet		20.00

2 Looking Glasses	4.00 each	8.00
2 Bureaus	7.00 each	14.00
" Plain		5.00
Wash Stand		5.00
1 Set Chamber Ware,Pitcher		4.00
2 Looking Glasses	3.50 each	7.00
1 bedstead and Bedding		30.00
4 Cane Seated Chairs	0.25 each	1.00
1 Small Hinge Table		.50
Carpet		5.00
Entry Carpet		2.50
Entry Table		2.50
Side Board		5.00
Mahogany Table		4.00
" "		4.00
" "		3.00
	Subtotal	488.50
Fire Screen		.50
Small Table and Dressing Case		1.00
8 Rush Seated Chairs	0.25 each	2.00
Looking Glass		5.00
Carpet		5.00
Clock		4.00
Looking Glass		5.00
4 Rattan Seat Chairs	0.25 each	1.00
2 Rush Seat Chairs		.25
Round Table		1.00
Desk Book Case		5.00
1 Lot of Books		25.00
1 Looking Glass		15.00
6 Hair Seated Chairs	1.50 each	9.00
" " Rocking Chair		1.50
2 Rush Bottom Chairs		1.00
1 arm Chair		.50
1 Set Tea [Poy ?]		5.00
Center Table		4.00
2 Stools	1.00 each	2.00
Screen		.50
Card Table		4.00
Carpet (Brussil)		20.00
" " (back Parlour)		20.00
8 Hair Seated Chairs	1.50 each	12.00
2 Rush " "		1.00
Hair Seated arm Chair		.50
" " Rocking Chair		3.00
Looking Glass		15.00
Stove Air Tight		10.00
Work Table and Pair Foot Stools		4.00
Sofa		5.00
1 Pair China Stools		2.00
Pair Mantle Vases		4.00
Counting House Desk and Stool		2.00
Entry and Stair Carpet		8.00

Entry Hat Rack	.... 1.50
Mohogany Table	.... 4.00
Mohogany Table Small	.... 1.00
Umbrella Stand	.... .25
Clock	.... 2.00
Kitchen Table, Chain and with Kitchen Utensills.........10.00	
1 set China Crokery and Glass..........................10.00	
1 Lot SilverWare (Old) 210 oz. at 1.25 per oz.	262.50
Gold Watch,and Chain	...........................60.00
Pier TAble Marble Top (Parlour)........................ 4.00	
Roan Hourse	..........................175.00
Single Carriage...25.00, and Harness...10.00...........35.00	

-Rockland Place-	1264.50

1 Bay Horse	...................100.00	
1 Dun Horse	...................125.00	
Market Wagon and Cart	...................100.00	
Lot of Agricultural Impliments..................15.00		
Red Cow (Dry)	....................30.00	
White Cow	....................35.00	
Lot of Old Furniture	....................30.00	

		435.00
Cash		353.88

		2053.38
1 Lot East India China		30.00

	Total	2083.38

Philadelphia: July 17, 1865 Completed By James Willson and Isaac L. Wister.

Will of Issac Jones #52, 1865. Register of Wills. City Hall Annex, Philadelphia Pa.

Appendix #26

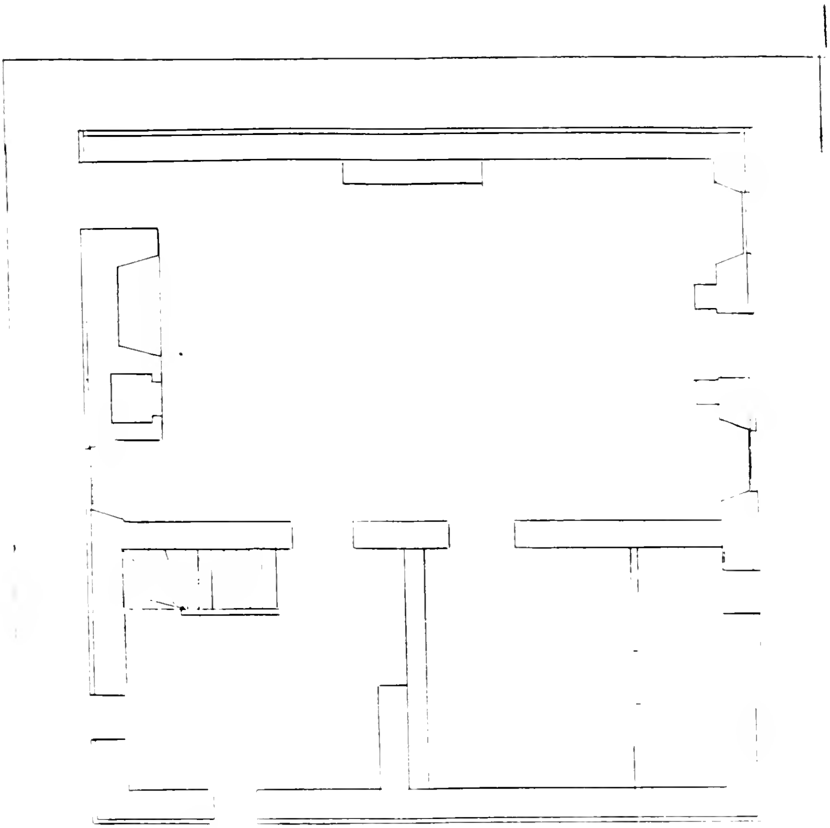
Rockland Floor Plans

From: Rockland File. Fairmount Park Commission Files.,
Fairmount Park Commission. Memorial Hall Philadelphia Pa.

Appendix #26

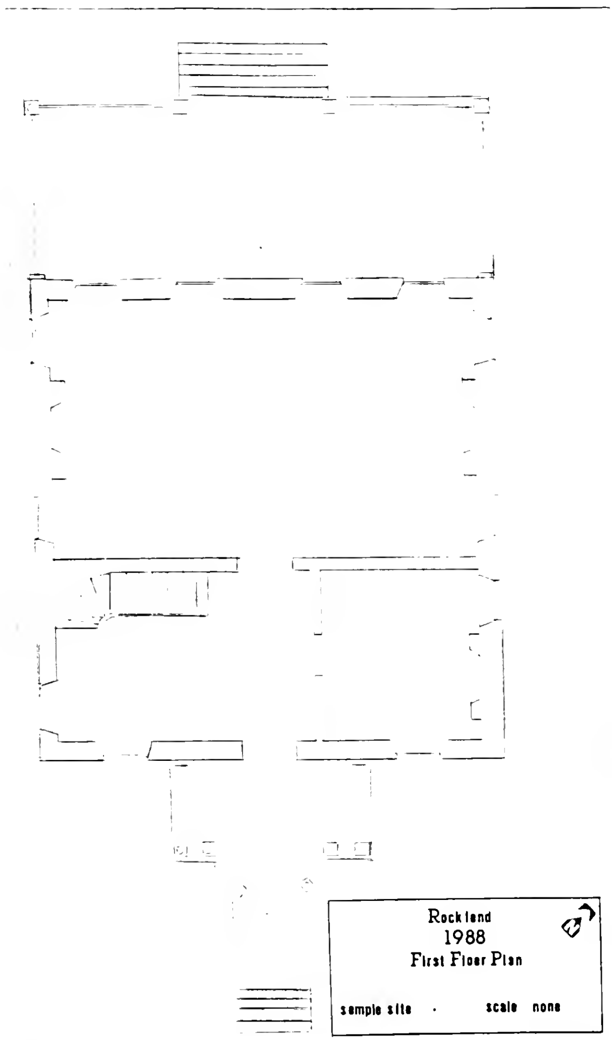
Rockland Floor Plans

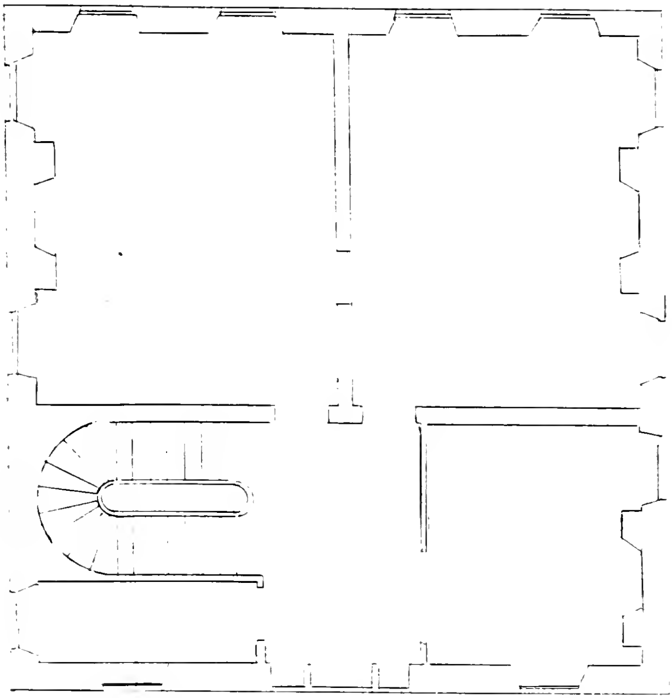
From: Rockland File. Fairmount Park Commission Files., Fairmount Park Commission. Memorial Hall Philadelphia Pa.



Rockland
1988
Cellar Floor Plan

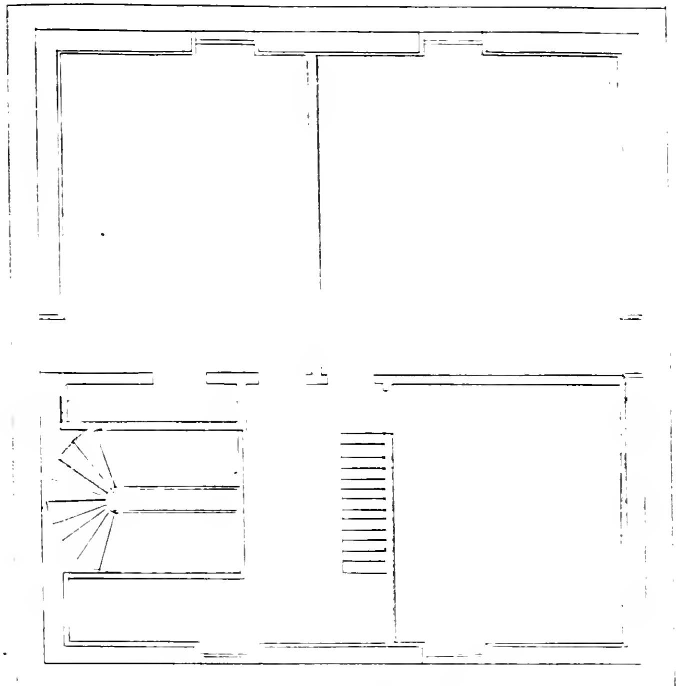
sample site · scale none


Rockland
1988
First Floor Plan
sample site
scale none



Rockland
1988
Second Floor Plan

sample site •   scale none



Rockland
1988
Third Floor Plan

sample site · scale none

Appendix #27

Rockland

Exterior Maintenance Problems

Rockland East Elevation

North Elevation

Rockland West Elevation

South Elevation

Maintenance Problems Encountered at Rockland

Leaking Water Valve in the Basement

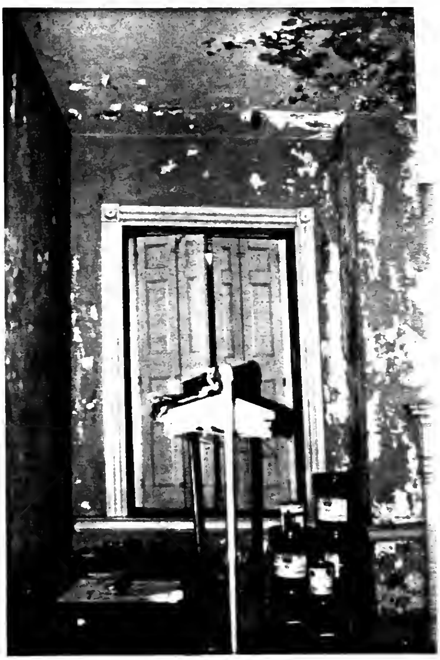
Water seeps through a basement door during heavy rain. Evidence or rising damp on the wall.

East wall of basement is covered with salt deposits left by evaporating water.

South Elevation, structural problem: this wall drops and bulges out.

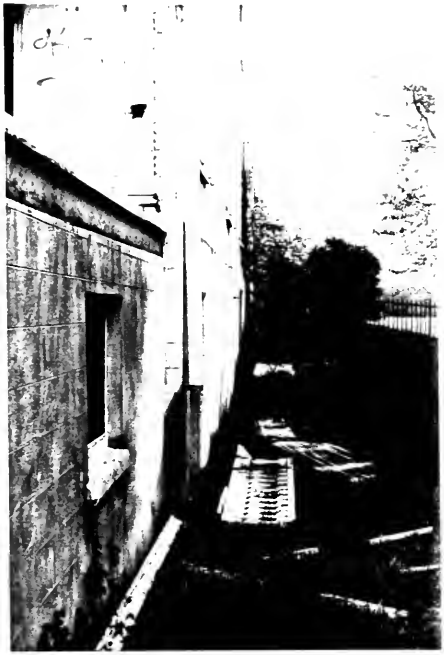
Crack in South Wall Extending from Roof to above the Deformation.

The interior first floor window in the dining room and the second floor window above show the effect of the drop in the wall.



Water penetration into the wall has caused the delamination of the rubble dash stucco in certain areas. The wooden porch column also shows the effects of water.

A broken leader pipe drains rain water onto the building wall and a section of porch balluster is seen on the ground. On the opposite side of the building the leader is also broken



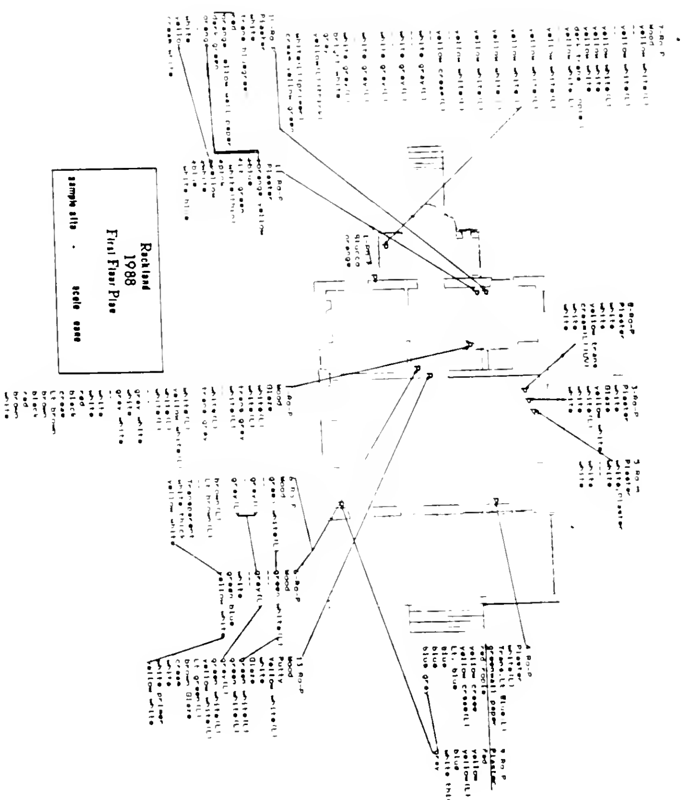
When the back porch stairs were removed some of the ruled stucco was damaged.

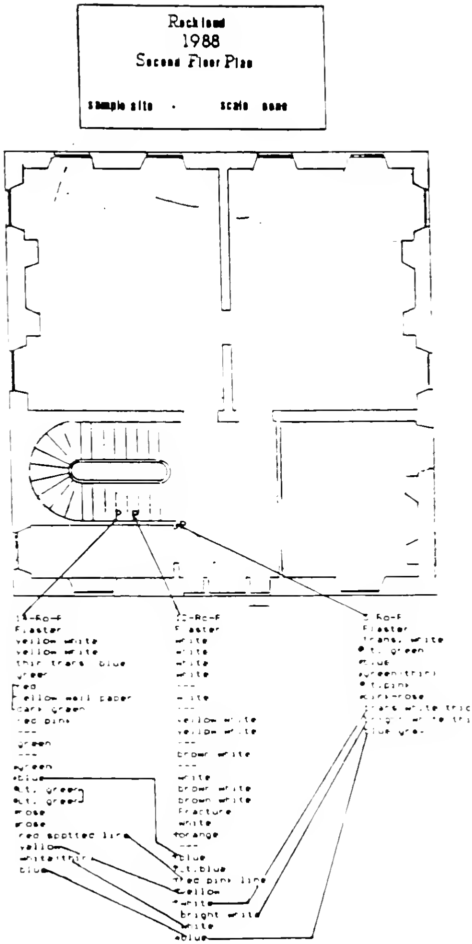
All of the interior surfaces are peeling.

Damage to the third floor ceiling caused by a bad roof.

Appendix A28

Rockland Point Stratigraphy


Rockland
1988
First Floor Plan
sample site
scale none


Rockland
1988
Second Floor Plan
sample site
scale none
Plaster
yellow white
yellow white
thin trans. blue
red
yellow wall paper
dark green
red pink
green
green
blue
lt. green
lt. green
rose
rose
red spotted line
yellow
white(thin)
blue
Plaster
white
white
white
white
white
yellow white
yellow white
brown white
white
brown white
brown white
Fracture
white
orange
blue
lt. blue
red pink line
yellow
white
bright white
white
blue
Plaster
trans. white
lt. green
blue
green(thin)
lt. pink
dark rose
trans white thick
bright white thin
blue grey

Phase I: Sequence of Layers 1-Ro-P
Structure Rockland
Location of Sample exterior paint sample from staircase board final
Date Removed March 1988 Removed By MVT
Significant Facts Regarding The Structure's History Which May Pertain The To The Analysis (dateconstructed, significant alterations, dates painted)

DATA: Microscopic Analysis

CODES			Reaction of	
-Finish	(F)		Sodium Sulfide	(Na_2S)
Primer	(P)		Hydrochloric Acid	(HCl)
Glaze	(G)		Dimethylformamide	(DMF)
Varnish	(V)		Methylene Chloride	(CH_2CL_2)
Shellac	(S)		Water	(H_2O)
Wall paper	(W)		Alcohol	(OH)
Fracture	( )		Turentine	(TURP)
Dirt Layer	(-)		Near UV Light	(UV)

Note layers of decorative painting, if any: (graining, marbleizing, polychromy ect.).

	Chromochronology	Comments			Chromochronology	Comments
Substrate:	wood					
1.	—			16.	white	DMF
2.	white	Na_2S DMF		17.	gray white	
3.	white	Na_2S DMF		18.	—	
4.	translucent gray	—		19.	white	
5.	white	Na_2S DMF		20.	white	
6.	—			21.	Red	
7.	white	Na_2S DMF		22.	black	
8.	translucent gray	—		23.	cream	
9.	—			24.	lt. brown	
10.	white	Na_2S		25.	brown	
11.	yellow white	Na_2S		26.	black	
12.	white	Na_2S		27.	Red	
13.	white	Na_2S		28.	Brown	
14.	—			29.	white	
15.	gray white	DMF		30.		

Summary:

Phase II: Analysis and Recommendations 1-a5-P
Structure ______
Location of Sample ______
Date Removed ______ Removed By ______

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis ______

No. of Layers to be Studied #1, 2, 3
Reason for Layer Selection: ______
Visual Characteristics of Layer to be Matched: (relative thinness, thickness glassiness, ropiness, ect.): ______

MEDIUM ANALYSIS: (Separate paint/finishlayer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil	#1 — #2 DMF	softened by DMF
Latex		
Whitewash/calcimine	#3 HCl DMF	
waterbased/distemper		
Varnish		
Shellac		

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes ___ no ✓, Color ______
Probable pigment associated with flourescence: ______

Possible Pigment Type	Spot Test	Reaction
#1 lead white	KI	yellow ppt
#2 lead white	"	"
#3 lead white	"	"
#3 cobalt blue	Acid HNO3	rectangular b/w prisms

→ major contaminated from other layers

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): #1 & 2 lead white in linseed oil
Probable medium: #3 cobalt size, lead filler calcimine

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if approprate.)

Butens paint color ______ Sherwin-Williams ______

RECOMMENDATIONS

Color: ______
Paint Type: ______

DOCUMENTATION
Sample/slide NO: — RC — P
Report prepared - Date: — 24 By Whom: MV

Phase I: Sequence of Layers 2 - Ro - P
Structure Kirkland
Location of Sample [illegible] south side dining room ceiling paint sample
Date Removed March 1988 Removed By MJ
Significant Facts Regarding The Structure's History Which May Pertain The To The Analysis (dateconstructed, significant alterations, dates painted)
how ceiling was treated

DATA: Microscopic Analysis

CODES		Reaction of	
-Finish	(F)	Sodium Sulfide	(Na_2S)
Primer	(P)	Hydrochloric Acid	(HCl)
Glaze	(G)	Dimethylformamide	(DMF)
Varnish	(V)	Methylene Chloride	(CH_2CL_2)
Shellac	(S)	Water	(H_2O)
Wall paper	(W)	Alcohol	(OH)
Fracture	( )	Turentine	(TURP)
Dirt Layer	(-)	Near UV Light	(UV)

Note layers of decorative painting, if any: (graining, marbleizing, polychromy ect.).

	Chromochronology	Comments
Substrate:	Plaster [illegible]	coats DMF
1.	G	←
2.	yellow white	light ←
3.	yellow white thin	← ←
4.		
5.		
6.		
7.		
8.		
9.		
10.		
11.		
12.		
13.		
14.		
15.		
16.		
17.		
18.		
19.		
20.		
21.		
22.		
23.		
24.		
25.		
26.		
27.		
28.		
29.		
30.		

Summary:

Phase II: Analysis and Recommendations 2-Ro-?
Structure ______
Location of Sample ______
Date Removed ______ Removed By ______

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis ______

No. of Layers to be Studied ______
Reason for Layer Selection: ______
Visual Characteristics of Layer to be Matched: (relative thinness, thickness glassiness, ropiness, ect.): ______

MEDIUM ANALYSIS: (Separate paint/finishlayer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil	DMF	softened
Latex		
Whitewash/calcimine		
Waterbased/distemper		
Varnish		
Shellac		

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes ____ no ✓, Color ______
Probable pigment associated with flourescence: ______

	Possible Pigment Type	Spot Test	Reaction
#3	lead white	KI	yellow
#2	white	HNO_3	gas evolution
		H_2SO_4 + heat	formation of long crystals

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): #3 lead white
Probable medium: #2 whiting in linseed oil

COLOR: (Match sample to color standards; place under UV light for bleacning purposes if approprate.)

Butens paint color ______ Sherwin-Williams ______

RECOMMENDATIONS

Color: ______
Paint Type: ______

DOCUMENTATION
Sample/slide NO: ______
Report prepared - Date: July '88 By Whom: MY

Phase I: Sequence of Layers 3- Ro- F

Structure Rockland

Location of Sample Interior South side From ceiling dining room

Date Removed ____________ Removed By MVJ

Significant Facts Regarding The Structure's History Which May Pertain The To The Analysis (dateconstructed, significant alterations, dates painted)

DATA: Microscopic Analysis

CODES		Reaction of	
-Finish	(F)	Sodium Sulfide	(Na_2S)
Primer	(P)	Hydrochloric Acid	(HCI)
Glaze	(G)	Dimethylformamide	(DMF)
Varnish	(V)	Methylene Chloride	(CH_2CL_2)
Shellac	(S)	Water	(H_2O)
Wall paper	(W)	Alcohol	(OH)
Fracture	( )	Turentine	(TURP)
Dirt Layer	(-)	Near UV Light	(UV)

Note layers of decorative painting, if any: (graining, marbleizing, polychromy ect.).

Chromochronology	Comments
Substrate: Plaster	
1. white	HNO_3
2. x	
3. yellow white	DMF
4. white	DMF
5. white	DMF
6. white	DMF
7.	
8.	
9.	
10.	
11.	
12.	
13.	
14.	
15.	
16.	
17.	
18.	
19.	
20.	
21.	
22.	
23.	
24.	
25.	
26.	
27.	
28.	
29.	
30.	

Summary:

Phase II: Analysis and Recommendations 5-20-?
Structure ____
Location of Sample ____
Date Removed ____ Removed By ____

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis ____

No. of Layers to be Studied #1 layer
Reason for Layer Selection: ____
Visual Characteristics of Layer to be Matched: (relative thinness, thickness glassiness, ropiness, ect.): ____

MEDIUM ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil		
Latex		
Whitewash/calcimine	HCl	evolution of gas
Waterbased/distemper		
Varnish		
Shellac		

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes ___ no ✓, Color ____
Probable pigment associated with flourescence: ____

Possible Pigment Type	Spot Test	Reaction
lead/whiting	HNO3	evolution of gas
lead	KI	
whiting	H_2SO_4	formation of needles

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): whiting
Probable medium: calcimine

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if appropriate.)

Butens paint color white Sherwin-Williams ____

RECOMMENDATIONS

Color: ____
Paint Type: ____

DOCUMENTATION
Sample/slide NO: 7-RO-D
Report prepared - Date: July 23 By Whom: MVJ

Phase I: Sequence of Layers

Structure 4-Ro-F-Rockland

Location of Sample Interior west side dining room wall south side 1' from ceiling

Date Removed March 85 Removed By MV

Significant Facts Regarding The Structure's History which May Pertain The To The Analysis (dateconstructed, significant alterations, dates painted)

DATA: Microscopic Analysis

CODES		Reaction of	
-Finish	(F)	Sodium Sulfide	(Na_2S)
Primer	(P)	Hydrochloric Acid	(HCl)
Glaze	(G)	Dimethylformamide	(DMF)
Varnish	(V)	Methylene Chloride	(CH_2CL_2)
Shellac	(S)	Water	(H_2O)
Wall paper	(W)	Alcohol	(OH)
Fracture	( )	Turentine	(TURP)
Dirt Layer	(-)	Near UV Light	(UV)

Note layers of decorative painting, if any: (graining, marbleizing, polychromy ect.).

Substrate: Plaster

	Chromochronology	Comments		Chromochronology	Comments
1.	white	Na_2S / HCl / DMF	16.		
2.	transparent Lt. Blue	Na_2S / HCL / DMF	17.		
3.	Green wallpaper	DMF	18.		
4.	Red	DMF	19.		
5.	Yellow cream	DMF	20.		
6.	Yellow cream	Na_2S DMF	21.		
7.	Lt Blue	DMF	22.		
8.	Blue	DMF	23.		
9.	Blue	DMF	24.		
10.	Gray	DMF	25.		
11.			26.		
12.			27.		
13.			28.		
14.			29.		
15.			30.		

Summary:

wall paper w/ Herzbergs stain color yellow

looking fibers not chemically

Phase II: Analysis and Recommendations 4-20-?
Structure ______
Location of Sample ______
Date Removed ______ Removed By ______

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis ______

No. of Layers to be Studied ______
Reason for Layer Selection: ______
Visual Characteristics of Layer to be Matched: (relative thinness, thickness glassiness, ropiness, ect.): ______

MEDIUM ANALYSIS: (Separate paint/finishlayer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil		
Latex		
Whitewash/calcimine		
Waterbased/distemper		
Varnish		
Shellac		

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes___no___. Color ______
Probable pigment associated with flourescence: ______

	Possible Pigment Type	Spot Test	Reaction
#1 #2	lead white	Na_2S + HCL calcium + jack foil	+
	Prussian blue	NaOH + HCL	Blue → Brown → Blue

PIGMENT AND MEDIUM TYPE: wallpaper yellow + blue pigment = green red colored strands dissolving in H_2O

Probable pigment(s): ______
Probable medium: ______

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if appropriate.)

Butens paint color ______ Sherwin-Williams ______

RECOMMENDATIONS

Color: ______
Paint Type: ______

DOCUMENTATION
Sample/slide NO: ______
Report prepared - Date: ______ By Whom: ______

Phase 1: Sequence of Layers 5-RO-P
Structure Kirkland
Location of Sample 2nd floor paint trade above chair rail
Date Removed March '86 Removed By MVJ
Significant Facts Regarding The Structure's History which May Pertain The To The Analysis (dateconstructed, significant alterations, dates painted)
c 1810

DATA: Microscopic Analysis

CODES		Reaction of	
-Finish	(F)	Sodium Sulfide	(Na_2S)
Primer	(P)	Hydrochloric Acid	(HCI)
Glaze	(G)	Dimethylformamide	(DMF)
Varnish	(V)	Methylene Chloride	(CH_2CL_2)
Shellac	(S)	Water	(H_2O)
Wall paper	(W)	Alcohol	(OH)
Fracture	( )	Turentine	(TURP)
Dirt Layer	(-)	Near UV Light	(UV)

Note layers of decorative painting, if any: (graining, marbleizing, polychromy ect.).

Substrate: Plaster

	Chromochronology	Comments	Na_2S		CH_2Cl_2	
1.	translucent white	HCl	–			
2.	lt green	HCl	–			
3.	blue		–			+
4.	thin green		-			+
5.	lt pink					+
6.	pink - rose		–			+
7.	thick translucent white		–			
8.	bright white thin		–		+	
9.	blue gray		–		+	
10.						
11.						
12.						
13.						
14.						
15.						

	Chromochronology	Comments
16.		
17.		
18.		
19.		
20.		
21.		
22.		
23.		
24.		
25.		
26.		
27.		
28.		
29.		
30.		

Summary:

Phase II: Analysis and Recommendations 5-20-P
Structure________________
Location of Sample________________
Date Removed________________ Removed By________________

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis________________

No. of Layers to be Studied________________
Reason for Layer Selection:________________
Visual Characteristics of Layer to be Matched: (relative thinness, thickness glassiness, ropiness, ect.):________________

MEDIUM ANALYSIS: (Separate paint/finishlayer from stratigraphy, if necessary.)

Possible medium	Chemical		Reaction	
	white	green	white	gr
Oil	Dmf	–	–	–
Latex	CH_2Cl_2		–	–
Whitewash/calcimine	HCl		–	+
Waterbased/distemper	[illegible]		–	–
Varnish				
Shellac				

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes____no____, Color________________
Probable pigment associated with flourescence:________________

Possible Pigment Type	Spot Test	Reaction
Whiting	H_2SO_4	formation of calcium sulfate crystals
Copper containing	Potassium ferrocyanide	red color in crystals verdigris
Prussian blue	colorless (NaOH but not brown w/ acid	
Cobalt blue	Potassium mercuric thiocyanide	Positive test dark blue rectangular prisms

PIGMENT AND MEDIUM TYPE:

Probable pigment(s):________________
Probable medium:________________

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if approprate.)

Butens paint color ________________ Sherwin-Williams ________________

RECOMMENDATIONS

Color:________________
Paint Type:________________

DOCUMENTATION
Sample/slide NO:________________
Report prepared - Date:________ By Whom:________________

Phase I: Sequence of Layers 6-Ro-P
Structure Rockland
Location of Sample Interior 1st Fl entry paint sample of trim around doors
Date Removed March 22 Removed By MVJ
Significant Facts Regarding The Structure's History Which May Pertain The To The Analysis (dateconstructed, significant alterations, dates painted)

DATA: Microscopic Analysis

CODES		Reaction of	
-Finish	(F)	Sodium Sulfide	(Na_2S)
Primer	(P)	Hydrochloric Acid	(HCl)
Glaze	(G)	Dimethylformamide	(DMF)
Varnish	(V)	Methylene Chloride	(CH_2CL_2)
Shellac	(S)	Water	(H_2O)
Wall paper	(W)	Alcohol	(OH)
Fracture	( )	Turentine	(TURP)
Dirt Layer	(-)	Near UV Light	(UV)

Note layers of decorative painting, if any: (graining, marbleizing, polychromy ect.).

Chromochronology	Comments		
Substrate: wood			
1. green white		Na_2S	HCl
2. —			
3. gray		Na_2S	HCl
4. —			
5. white			DMF
6. Green tan			DMF
7. yellow white			DMF
8. —			
9.			
10.			
11.			
12.			
13.			
14.			
15.			

Chromochronology	Comments	
wood		
16. Green white	ropey	Na_2S
17. —		
18. gray	ropey	Na_2S
19. —		
20. gray	ropey	Na_2S
21. —		
22. brown		Na_2S
23. (- brown		Na_2S
24. —		
25. translucent		
26. white - thick		
27. yellow-white		
28. —		
29.		
30.		

Summary:

Phase II: Analysis and Recommendations 6-Ro-P
Structure ______
Location of Sample ______
Date Removed ______ Removed by ______

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis ______

No. of Layers to be Studied #1, 2
Reason for Layer Selection: first coat
Visual Characteristics of Layer to be Matched: (relative thinness, thickness glassiness, ropiness, ect.): ______

MEDIUM ANALYSIS: (Separate paint/finishlayer from stratigraphy, if necessary.)

Possible medium		Chemical	Reaction
Oil	#1, 2	DMF	—
Latex			
Whitewash/calcimine	#1, 2	HCl	+/ H_2SO_4
waterbased/distemper			
Varnish			
Shellac			

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes ___ no ✓, Color ______
Probable pigment associated with flourescence: ______

	Possible Pigment Type	Spot Test	Reaction
#2	lead white	KI	yellow
#1	" "	KI	+

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): lead white
Probable medium: linseed oil

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if approprate.)
#1 Effervescent
Butens paint color #2 2542 Vista Sea Sherwin-Williams ______

RECOMMENDATIONS

Color: ______
Paint Type: ______

DOCUMENTATION
Sample/slide NO: ______
Report prepared - Date: ______ By Whom: ______

Phase 1: Sequence of Layers 7-Co-8
Structure [illegible]
Location of Sample [illegible] on front porch
Date Removed March [illegible] Removed By MVS
Significant Facts Regarding The Structure's History Which May Pertain The To The Analysis (dateconstructed, significant alterations, dates painted)

DATA: Microscopic Analysis

CODES		Reaction of	
-Finish	(F)	Sodium Sulfide	(Na_2S)
Primer	(P)	Hydrochloric Acid	(HCI)
Glaze	(G)	Dimethylformamide	(DMF)
Varnish	(V)	Methylene Chloride	(CH_2CL_2)
Shellac	(S)	Water	(H_2O)
Wall paper	(W)	Alcohol	(OH)
Fracture	( )	Turentine	(TURP)
Dirt Layer	(-)	Near UV Light	(UV)

Note layers of decorative painting, if any: (graining, marbleizing, polychromy ect.).

	Chromochronology	Comments
Substrate:	wood	Na_2S
1.	yellow white	+
2.	—	+
3.	yellow white	+
4.	—	
5.	yellow white	+
6.	yellow white	
7.	yellow white	
8.	dark [illegible] — [illegible]	+
9.	yellow white	+
10.	—	
11.	yellow white	—
12.	—	
13.	yellow white	+
14.	—	
15.	yellow white	+
16.	yellow white	+
17.	yellow white	+
18.	yellow white	+
19.	yellow white	+
20.	white gray	+
21.	yellow	+
22.	white gray	+
23.	white gray	+
24.	white gray	+
25.	white gray	+
26.	[illegible] white	
27.	gray	
28.	yellow — thick	+
29.	—	
30.	Primer — white	+
	cream yellow green	

Summary:

Phase II: Analysis and Recommendations 7-20-?
Structure ______
Location of Sample ______
Date Removed ______ Removed By ______

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis ______

No. of Layers to be Studied ______
Reason for Layer Selection: ______
Visual Characteristics of Layer to be Matched: (relative thinness, thickness glassiness, ropidess, ect.): ______

MEDIUM ANALYSIS: (Separate paint/finishlayer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil	DMF	softened
Latex		
Whitewash/calcimine	HCl	–
Waterbased/distemper		
Varnish		
Shellac		

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes___no___, Color ______
Probable pigment associated with flourescence: ______

Possible Pigment Type	Spot Test	Reaction
lead	Na_2S	turned black

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): lead & lime
Probable medium: [illegible]

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if approprate.)

Butens paint color — amount of dirt makes this impossible Sherwin-Williams ______

RECOMMENDATIONS

Color: ______
Paint Type: ______

DOCUMENTATION
Sample/slide NO: ______
Report prepared - Date: ______ By Whom: ______

Phase I: Sequence of Layers 8-RO-P
Structure Rockland
Location of Sample Interior Dining room South ceiling
Date Removed March 1988 Removed By MVJ
Significant Facts Regarding The Structure's History Which May Pertain The To The Analysis (dateconstructed, significant alterations, dates painted)

DATA: Microscopic Analysis

CODES			Reaction of	
-Finish	(F)		Sodium Sulfide	(Na_2S)
Primer	(P)		Hydrochloric Acid	(HCl)
Glaze	(G)		Dimethylformamide	(DMF)
Varnish	(V)		Methylene Chloride	(CH_2CL_2)
Shellac	(S)		Water	(H_2O)
Wall paper	(W)		Alcohol	(OH)
Fracture	( )		Turentine	(TURP)
Dirt Layer	(-)		Near UV Light	(UV)

Note layers of decorative painting, if any: (graining, marbleizing, polychromy ect.).

	Chromochronology	Comments		Chromochronology	Comments
Substrate:	Plaster				
1.	white white	HCl HCl	16.		
2.	Yellow [illegible]	[illegible]	17.		
3.	creamy	Na_2S / fluorescent DMF	18.		
4.	white	DMF CH_2Cl_2	19.		
5.	white	DMF CH_2Cl_2	20.		
6.			21.		
7.			22.		
8.			23.		
9.			24.		
10.			25.		
11.			26.		
12.			27.		
13.			28.		
14.			29.		
15.			30.		

Summary:

Phase II: Analysis and Recommendations - R5-P
Structure ____
Location of Sample ____
Date Removed ____ Removed By ____

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis ____

No. of Layers to be Studied ____
Reason for Layer Selection: ____
Visual Characteristics of Layer to be Matched: (relative thinness, thickness glassiness, ropiness, ect.): ____

MEDIUM ANALYSIS: (Separate paint/finishlayer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil layer #1	DMF	−
Latex		
Whitewash/calcimine	HCl	−
Waterbased/distemper		
Varnish		
Shellac		

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes ___ no ___, Color ____
Probable pigment associated with flourescence: ____

Possible Pigment Type	Spot Test	Reaction
lead white	Na_2S	+
	KI	+

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): lead oxide
Probable medium: calcimine

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if approprate.)

Butens paint color white Sherwin-Williams ____

RECOMMENDATIONS

Color: ____
Paint Type: ____

DOCUMENTATION
Sample/slide NO: ____
Report prepared - Date: ____ By Whom: ____

Phase I: Sequence of Layers 9-10-P

Structure Rockland

Location of Sample Interior W. wall NW corner below chair rail

Date Removed April '88 Removed By JMV

Significant Facts Regarding The Structure's History Which May Pertain The To The Analysis (dateconstructed, significant alterations, dates painted)

no alteration c. 1810

DATA: Microscopic Analysis

CODES		Reaction of	
-Finish	(F)	Sodium Sulfide	(Na_2S)
Primer	(P)	Hydrochloric Acid	(HCI)
Glaze	(G)	Dimethylformamide	(DMF)
Varnish	(V)	Methylene Chloride	(CH_2CL_2)
Shellac	(S)	Water	(H_2O)
Wall paper	(W)	Alcohol	(OH)
Fracture	( )	Turentine	(TURP)
Dirt Layer	(-)	Near UV Light	(UV)

Note layers of decorative painting, if any: (graining, marbleizing, polychromy ect.).

Substrate: Plaster

	Chromochronology	Comments
1.	Red	acid/
2.	Yellow	primer DMF
3.	Yellow	Na_2S DMF
4.	Blue	DMF
5.	white thin	primer CH_2Cl_2
6.	Gray	CH_2Cl_2
7.		
8.		
9.		
10.		
11.		
12.		
13.		
14.		
15.		

	Chromochronology	Comments
16.		
17.		
18.		
19.		
20.		
21.		
22.		
23.		
24.		
25.		
26.		
27.		
28.		
29.		
30.		

Summary:

Phase II: Analysis and Recommendations 4-Ro-P
Structure
Location of Sample
Date Removed   Removed By

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis 1st 3 layers 1,2,3

No. of Layers to be Studied
Reason for Layer Selection:
Visual Characteristics of Layer to be Matched: (relative thinness, thickness glassiness, ropiness, ect.):

MEDIUM ANALYSIS: (Separate paint/finishlayer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil	Red - DMF	−
Latex		
Whitewash/calcimine	Red HCL	+
Waterbased/distemper		
Varnish		
Shellac		
White oil	DMF	+

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes ___ no ✓, Color
Probable pigment associated with flourescence:

	Possible Pigment Type	Spot Test	Reaction
Red	Iron oxide	Potassium ferrocyanide	+
White	lead white	KI	+ both primer & finish coat

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): Red- Iron oxide   white lead white
Probable medium: Red calcimine   white linseed oil

COLOR: (Match sample to color standards; place under UV light for bleacning purposes if approprate.)

Butens paint color   Sherwin-Williams

RECOMMENDATIONS

Color: Red Iron oxide
Paint Type: white titanium oxide in linseed oil

DOCUMENTATION
Sample/slide NO: 4-Ro-P
Report prepared - Date: July   By Whom: MV

Phase I: Sequence of Layers 10-Ro-1
Structure Rockland
Location of Sample Interior east side entry
Date Removed March 85 Removed By MV
Significant Facts Regarding The Structure's History Which May Pertain The To The Analysis (dateconstructed, significant alterations, dates painted)

DATA: Microscopic Analysis

CODES		Reaction of	
-Finish	(F)	Sodium Sulfide	(Na_2S)
Primer	(P)	Hydrochloric Acid	(HCl)
Glaze	(G)	Dimethylformamide	(DMF)
Varnish	(V)	Methylene Chloride	(CH_2CL_2)
Shellac	(S)	Water	(H_2O)
Wall paper	(W)	Alcohol	(OH)
Fracture	( )	Turentine	(TURP)
Dirt Layer	(-)	Near UV Light	(UV)

Note layers of decorative painting, if any: (graining, marbleizing, polychromy ect.).

Chromochronology	Comments
Substrate: Plaster	
1. white	
2. translucent blue green	See 14-Ro-P
3. red	Same color
4. orange yellow wall paper	wall paper
5. dark green	
6. orange	
7.	
8. white	
9. yellow	
10. dark cream	
11.	
12.	
13.	
14.	
15.	

Chromochronology	Comments
16.	
17.	
18.	
19.	
20.	
21.	
22.	
23.	
24.	
25.	
26.	
27.	
28.	
29.	
30.	

Summary:

Phase II: Analysis and Recommendations 10-85-?
Structure ____________________
Location of Sample ____________________
Date Removed ____________________ Removed by ____________________

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis ____________________

No. of Layers to be Studied ____________________
Reason for Layer Selection: ____________________
Visual Characteristics of Layer to be Matched: (relative thinness, thickness glassiness, ropiness, ect.): ____________________

MEDIUM ANALYSIS: (Separate paint/finishlayer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil		
Latex		
Whitewash/calcimine		
Waterbased/distemper		
Varnish		
Shellac		

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes___no___, Color ____________________
Probable pigment associated with flourescence: ____________________

Possible Pigment Type	Spot Test	Reaction
	14-P	
	Ro-14	

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): ____________________
Probable medium: ____________________

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if approprate.)

Butens paint color ____________ Sherwin-Williams ____________

RECOMMENDATIONS

Color: ____________________
Paint Type: ____________________

DOCUMENTATION
Sample/slide NO: ____________________
Report prepared - Date: __________ By Whom: ____________________

Phase I: Sequence of Lavers 11-Ro-P
Structure Rockland
Location of Sample Interior east side entry
Date Removed March 88 Removed By MV
Significant Facts Regarding The Structure's History Which May Pertain The To The Analysis (dateconstructed, significant alterations, dates painted)
c/810

DATA: Microscopic Analysis

CODES -Finish (F)
Primer (P)
Glaze (G)
Varnish (V)
Shellac (S)
Wall paper (W)
Fracture ( )
Dirt Layer (-)

Reaction of Sodium Sulfide (Na_2S)
Hydrochloric Acid (HCl)
Dimethylformamide (DMF)
Methylene Chloride (CH_2CL_2)
Water (H_2O)
Alcohol (OH)
Turentine (TURP)
Near UV Light (UV)

Note layers of decorative painting, if any: (graining, marbleizing, polychromy ect.).

Chromochronology	Comments		
Substrate: Plaster	Na_2S	H_2O	
1. orange yellow	-	+	+
2. olive	-	+	
3. Lt green	-	+	
4. thin white layer	-	+	+
5. pink	-	+	
6. yellow	-		+
7. white	-		
8. blue	-		
9. white t...	-		
10.			
11.			
12.			
13.			
14.			
15.			

Chromochronology	Comments
16.	
17.	
18.	
19.	
20.	
21.	
22.	
23.	
24.	
25.	
26.	
27.	
28.	
29.	
30.	

Summary:

Phase II: Analysis and Recommendations 11-132-P
Structure
Location of Sample
Date Removed   Removed By

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis

No. of Layers to be Studied #/2
Reason for Layer Selection:
Visual Characteristics of Layer to be Matched: (relative thinness, thickness glassiness, ropiness, ect.): Thin w/out shine

MEDIUM ANALYSIS: (Separate paint/finishlayer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil	DMF +	-
Latex	CH₂Cl₂ -	-
Whitewash/calcimine	HCl -	-
Waterbased/distemper	H_2O +	-
Varnish		
Shellac		

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes___no___, Color
Probable pigment associated with flourescence:

Possible Pigment Type	Spot Test	Reaction
Orange	Negative Na_2S for chromate inconclusive	- inconclusive
Blue		- in color - ultramarine

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): Blue - ultramarine
Probable medium: Orange   yellow ocher

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if approprate.)

Butens paint color Orange P Liberty gold   Sherwin-Williams

RECOMMENDATIONS

Color:
Paint Type:

DOCUMENTATION
Sample/slide NO:
Report prepared - Date: By Whom:

Phase I: Sequence of Layers 12-Ro-P
Structure Richland
Location of Sample Interior, Stairway wall 2nd floor above chair rail
Date Removed ______ Removed By ______
Significant Facts Regarding The Structure's History Which May Pertain The To The Analysis (dateconstructed, significant alterations, dates painted)

DATA: Microscopic Analysis

CODES		Reaction of	
-Finish	(F)	Sodium Sulfide	(Na_2S)
Primer	(P)	Hydrochloric Acid	(HCI)
Glaze	(G)	Dimethylformamide	(DMF)
Varnish	(V)	Methylene Chloride	(CH_2CL_2)
Shellac	(S)	Water	(H_2O)
Wall paper	(W)	Alcohol	(OH)
Fracture	( )	Turentine	(TURP)
Dirt Layer	(-)	Near UV Light	(UV)

Note layers of.decorative painting, if any: (graining, marbleizing, polychromy ect.).

Substrate: Plaster

	Chromochronology	Comments
1.	white	HCl
2.	white	HCl
3.	white	HCl
4.	white	HCl
5.	—	
6.	white	
7.	—	
8.	yellow white	HCl
9.	Yellow white	HCl
10.	—	
11.	Brown white	
12.	—	
13.	white	HCl
14.	Brown white	HCl
15.	Brown white	HCl
16.		
17.	white	DMF
18.	orange	DMF
19.	—	
20.	Blue	DMF
21.	Lt Blue	DMF
22.	Red Pink	DMF
23.	Yellow	DMF
24.	[illegible]	DMF
25.	Bright white	DMF
26.	white	DMF
27.	Blue	DMF
28.		
29.		
30.		

Summary: No lead

Phase II: Analysis and Recommendations

Structure ________________

Location of Sample ________________

Date Removed ________________ Removed By ________________

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis 1-4

No. of Layers to be Studied ________________

Reason for Layer Selection: ________________

Visual Characteristics of Layer to be Matched: (relative thinness, thickness glassiness, ropiness, ect.): ________________

MEDIUM ANALYSIS: (Separate paint finish layer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil		—
Latex		
Whitewash/calcimine	HCl	+
Waterbased/distemper		
Varnish		
Shellac		

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.

Flourescence under near ultraviolet: yes___ no___, Color ________

Probable pigment associated with flourescence: ________________

Possible Pigment Type	Spot Test	Reaction
lead white	Na_2S	— NR
	H_2SO_4 + Heat	

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): ________________

Probable medium: whitewash

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if approprate.)

Butens paint color whitewash Sherwin-Williams ________________

RECOMMENDATIONS

Color: ________________

Paint Type: whitewash

DOCUMENTATION

Sample/slide NO: ________________

Report prepared - Date: 7/25/86 By Whom: MJ

Phase I: Sequence of Layers 13-Ro-P
Structure Rickland
Location of Sample Interior doorway between entry & dining room from molding
Date Removed March 1988 Removed By MVD
Significant Facts Regarding The Structure's History Which May Pertain The To The Analysis (dateconstructed, significant alterations, dates painted)

DATA: Microscopic Analysis

CODES		Reaction of	
Finish	(F)	Sodium Sulfide	(Na_2S)
Primer	(P)	Hydrochloric Acid	(HCl)
Glaze	(G)	Dimethylformamide	(DMF)
Varnish	(V)	Methylene Chloride	(CH_2CL_2)
Shellac	(S)	Water	(H_2O)
Wall paper	(W)	Alcohol	(OH)
Fracture	( )	Turentine	(TURP)
Dirt Layer	(-)	Near UV Light	(UV)

Note layers of decorative painting, if any: (graining, marbleizing, polychromy ect.).

	Chromochronology	Comments	
Substrate:	Putty		
1.	Yellow white	Na_2S	
2.	white		
3.	G		
4.	Green white	Na_2S	DMF
5.	green white	Na_2S	
6.	gray	Na_2S	
7.	green white	Na_2S	
8.	yellow white	Na_2S	
9.	Lt green	Na_2S	
10.	Brown glaze		
11.	cream		
12.	white		
13.	Primer		
14.	yellow cream		
15.			

	Chromochronology	Comments
16.		
17.		
18.		
19.		
20.		
21.		
22.		
23.		
24.		
25.		
26.		
27.		
28.		
29.		
30.		

Summary:

Phase II: Analysis and Recommendations 13-R0-P

Structure ______

Location of Sample ______

Date Removed ______ Removed By ______

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis ______

No. of Layers to be Studied ______

Reason for Layer Selection: ______

Visual Characteristics of Layer to be Matched: (relative thinness, thickness glassiness, ropiness, ect.): ______

MEDIUM ANALYSIS: (Separate paint/finishlayer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil	DMF	—
Latex		
Whitewash/calcimine	HCl	+
Waterbased/distemper		
Varnish		
Shellac		

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes ___ no ✓, Color ______

Probable pigment associated with flourescence: ______

Possible Pigment Type	Spot Test	Reaction
#1 lead	Na_2S	turned black
#2 zinc or	$NaOH + HCl + K_4Fe(CN)_6$	—
whiting	HCl	+

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): lead

Probable medium: calcimine ?

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if approprate.)

Butens paint color ______ Sherwin-Williams ______

RECOMMENDATIONS

Color: ______

Paint Type: ______

DOCUMENTATION

Sample/slide NO: ______

Report prepared - Date: ______ By Whom: ______

Phase I: Sequence of Layers 14-Ko-P
Structure Woodland
Location of Sample Interior stairway wall 2nd floor below chair rail
Date Removed ______ Removed By ______
Significant Facts Regarding The Structure's History Which May Pertain To The Analysis (dateconstructed, significant alterations, dates painted)

DATA: Microscopic Analysis

CODES		Reaction of	
-Finish	(F)	Sodium Sulfide	(Na_2S)
Primer	(P)	Hydrochloric Acid	(HCI)
Glaze	(G)	Dimethylformamide	(DMF)
Varnish	(V)	Methylene Chloride	(CH_2CL_2)
Shellac	(S)	Water	(H_2O)
Wall paper	(W)	Alcohol	(OH)
Fracture	( )	Turentine	(TURP)
Dirt Layer	(-)	Near UV Light	(UV)

Note layers of decorative painting, if any: (graining, marbleizing, polychromy ect.). wall paper

Chromochronology	Comments
Substrate: plaster	Na_2S
1. 2 layers Yellow white	—
2. thin translucent blue	— oil
3. green - translucent	—
4. Red wallpaper w/ yellow center	— water soluble
5. —	
6. Green	
7.	
8. Green	
9. Blue	
10. Lt. Green	
11. Lt. Green	
12. Rose	
13. Rose	
14. Thin red spotted line	
15. Yellow	

Chromochronology	Comments
16. Thin white	
17. Blue	
18.	
19.	
20.	
21. Wallpaper, has green pigment	
22. - very dark green	
23.	
24. wallpaper - Red back	
25. - paper	
26. - dark green	
27. - red Pink	
28.	
29.	
30.	

Summary: Hertzog mostly yellow some red strands

Phase II: Analysis and Recommendations

Structure ______

Location of Sample ______

Date Removed ______ Removed By ______

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis ______

No. of Layers to be Studied #1,2,3,4

Reason for Layer Selection: ______

Visual Characteristics of Layer to be Matched: (relative thinness, thickness glassiness, ropiness, ect.): ______

MEDIUM ANALYSIS: (Separate paint/finishlayer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil	#1 DMF	+
Latex	#2 DMF	+
Whitewash/calcimine		
Waterbased/distemper	#4 Water base H_2O	Soluble
Varnish		
Shellac	#1&3 DMF	+

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes ____ no ✓, Color ______

Probable pigment associated with flourescence: ______

#2 Prussian Blue HNO_3 - No color A $NaOH$ = Brown color

Possible Pigment Type	Spot Test	Reaction
#1	H_2SO_4	Long needle
#1 lead	KI	
#4 Iron oxide	[illegible]	red color
#3 copper / chromium	[illegible] wallpaper	[illegible]

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): ______

Probable medium: ______

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if approprate.)

Butens paint color ______ Sherwin-Williams ______

RECOMMENDATIONS

Color: ______

Paint Type: ______

DOCUMENTATION

Sample/slide NO: ______

Report prepared - Date: ______ By Whom: ______

Phase I: Sequence of Layers 1-RO-m
Structure Rockland
Location of Sample exterior east side rubble dash stucco ~~delamination~~
Date Removed ______________ Removed By ______________
Significant Facts Regarding The Structure's History Which May Pertain The To The Analysis (dateconstructed, significant alterations, dates painted)

DATA: Microscopic Analysis

CODES		Reaction of	
-Finish	(F)	Sodium Sulfide	(Na_2S)
Primer	(P)	Hydrochloric Acid	(HCl)
Glaze	(G)	Dimethylformamide	(DMF)
Varnish	(V)	Methylene Chloride	(CH_2CL_2)
Shellac	(S)	Water	(H_2O)
Wall paper	(W)	Alcohol	(OH)
Fracture	( )	Turentine	(TURP)
Dirt Layer	(-)	Near UV Light	(UV)

Note layers of decorative painting, if any: (graining, marbleizing, polychromy ect.).

Chromochronology	Comments	Chromochronology	Comments
Substrate: stucco			
1. orange paint layer	DMF	16.	
2.		17.	
3.		18.	
4.		19.	
5.		20.	
6.		21.	
7.		22.	
8.		23.	
9.		24.	
10.		25.	
11.		26.	
12.		27.	
13.		28.	
14.		29.	
15.		30.	

Summary:

Phase II: Analysis and Recommendations | [illegible]

Structure ____________________

Location of Sample ____________________

Date Removed ____________________ Removed By ____________________

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis ____________________

No. of Layers to be Studied ____________________

Reason for Layer Selection: ____________________

Visual Characteristics of Layer to be Matched: (relative thinness, thickness glassiness, ropiness, ect.): ____________________

MEDIUM ANALYSIS: (Separate paint/finishlayer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil	DMF	+
Latex		
Whitewash/calcimine		
Waterbased/distemper		
Varnish		
Shellac		

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes____no____, Color ____________________

Probable pigment associated with flourescence: ____________________

Possible Pigment Type	Spot Test	Reaction
lead	Na2S	NR
chromate	[illegible]	NR

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): [illegible] / may be a yellowed white [illegible]

Probable medium: ____________________

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if approprate.)

Butens paint color ____________ Sherwin-Williams ____________

RECOMMENDATIONS

Color: ____________________

Paint Type: ____________________

DOCUMENTATION

Sample/slide NO: ____________________

Report prepared - Date: __________ By Whom: ____________________

Phase I: Sequence of Layers 5-Ro-m
Structure Rockland
Location of Sample Interior dining room south side ceiling
Date Removed March 88 Removed By MVJ
Significant Facts Regarding The Structure's History Which May Pertain The To The Analysis (dateconstructed, significant alterations, dates painted)

DATA: Microscopic Analysis

CODES -Finish (F)
Primer (P)
Glaze (G)
Varnish (V)
Shellac (S)
Wall paper (W)
Fracture ( )
Dirt Layer (-)

Reaction of Sodium Sulfide (Na_2S)
Hydrochloric Acid (HCI)
Dimethylformamide (DMF)
Methylene Chloride (CH_2CL_2)
Water (H_2O)
Alcohol (OH)
Turentine (TURP)
Near UV Light (UV)

Note layers of decorative painting, if any: (graining, marbleizing, polychromy ect.).

Substrate: Plaster

	Chromochronology	Comments	
1.	white	HCl	plaster
2.	white	HCl	DMF
3.			
4.	—		
5.	white	HCl	DMF
6.	white	HCl	DMF
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			

	Chromochronology	Comments
16.		
17.		
18.		
19.		
20.		
21.		
22.		
23.		
24.		
25.		
26.		
27.		
28.		
29.		
30.		

Summary:

Phase II: Analysis and Recommendations S-120-M
Structure ____________
Location of Sample ____________
Date Removed ____________ Removed By ____________

IN-DEPTH MICROSCOPIC/CHEMICAL ANALYSIS

Purpose of Phase II Analysis ____________

No. of Layers to be Studied ____________
Reason for Layer Selection: ____________
Visual Characteristics of Layer to be Matched: (relative thinness, thickness glassiness, ropiness, ect.): ____________

MEDIUM ANALYSIS: (Separate paint/finishlayer from stratigraphy, if necessary.)

Possible medium	Chemical	Reaction
Oil	[illegible]	2nd + 4th layer softened
Latex		
Whitewash/calcimine		
Waterbased/distemper		
Varnish		
Shellac		

PIGMENT ANALYSIS: (Separate paint/finish layer from stratigraphy, if necessary.)

Flourescence under near ultraviolet: yes ___ no ✓, Color ____________
Probable pigment associated with flourescence: ____________

Zinc ox

Possible Pigment Type	uv light Spot Test	Reaction
≈2 lead white	a few specks of lead	Black
whiting [illegible]	–	+
Gypsum $CaSO_4$	–	–
titanium oxide (3% peroxide	→	–

problems

PIGMENT AND MEDIUM TYPE:

Probable pigment(s): mixture of whiting and lead white
Probable medium: linseed oil

COLOR: (Match sample to color standards; place under UV light for bleaching purposes if approprate.)

Butens paint color ____________ Sherwin-Williams ____________

RECOMMENDATIONS

Color: ____________
Paint Type: ____________

DOCUMENTATION
Sample/slide NO: S-120-m
Report prepared - Date: ______ By Whom: ____________

Appendix #30
Rocket and Mortar Data Sheet

ex. 21 (continued)

MORTAR ANALYSIS: DATA SHEET

Name ____________ Sample No. FRO-m

Date ____________ Origin of sample Rockland
Exterior, East Side, Pebble Dash stucco
Below worm window

Visual description of sample (color, texture, hardness, inclusions, etc.): Lg Pebbles in white mortar
with ... layer of fine pebbles & yellow mortar
Below

Mortar Analysis :

Original weight of powdered sample (W_1) = 25.16 g.

Weight of filter paper (W_2) = 5.87 .55

Weight of filter paper + dry fines (W_3) = 9.07 g

Weight of dry fines (W_3 - W_2) = 1.65

Weight of dry sand (W_4) = 14.77

% of sand ((W_4/W_1) x 100) = 58.70

% of fines ((W_3 - W_2)/W_1 x 100) = [illegible]

% of dissolved binder = [illegible]

Observations: dissolution of binder, color of liquid: ____________
[illegible]

14.77

Characterization of Sand:

Microscopic Examination

% Finer than 4.75 mm
2.36 mm
1.18 mm
600 um
300 um
150 um
75 um
53 um
38 um

MORTAR ANALYSIS: DATA SHEET

Name ______________________ Sample No. 2-RO-m

Date ______________________ Origin of sample Rockland Exterior, E side layer below ~~front~~ 6-Ro-m

Visual description of sample (color, texture, hardness, inclusions, etc.): ~~Tan~~ Brown, white, soft very lg chunks ~~often~~ of lime w/ fine ground sand

---

Mortar Analysis :

Original weight of powdered sample (W_1) =	25.10
Weight of filter paper (W_2) =	5.84 + .56 = .40
Weight of filter paper + dry fines (W_3) =	9.66
Weight of dry fines (W_3 - W_2) =	2.26
Weight of dry sand (W_4) =	13.43
% of sand ((W_4/W_1) x 100) =	53.5 [illegible]
% of fines ((W_3 - W_2)/W_1 x 100) =	[illegible]
% of dissolved binder =	7.[illegible]

Observations: dissolution of binder, color of liquid: [illegible]

13.45

Characterization of Sand:

Microscopic Examination

% Finer than		
4.75	mm	—
2.36	mm	[illegible]
1.18	mm	7
600	um	59
300	um	[illegible]
150	um	[illegible]
75	um	[illegible]
53	um	[illegible]
38	um	

ex. 21 (continued)

MORTAR ANALYSIS: DATA SHEET

Name ______________ Sample No. 3-Ro-m

Date ______________ Origin of sample Rockland Interior, west wall of stairway, to Basement

Visual description of sample (color, texture, hardness, inclusions, etc.): White Brown w/ fiber - very soft a top plaster layer w/ Brown coat Below fibers Iron fragments

Mortar Analysis :

Original weight of powdered sample (W_1) =	25.10
Weight of filter paper (W_2) =	5.75 + .57 6.32
Weight of filter paper + dry fines (W_3) =	9.00
Weight of dry fines ($W_3 - W_2$) =	2.68 gr
Weight of dry sand (W_4) =	6.60 gr
% of sand ((W_4/W_1) x 100) =	26.[illegible]
% of fines (($W_3 - W_2)/W_1$ x 100) =	10.67%
% of dissolved binder =	63.[illegible]%

Observations: dissolution of binder, color of liquid: [illegible]

Characterization of Sand:

6.62 total

Microscopic Examination

% Finer than			
4.75	mm	n/a	
2.36	mm	[illegible]	3.17%
1.18	mm	[illegible]	16.92%
600	um	[illegible]	15.36%
300	um	[illegible]	22.91%
150	um		27.03%
75	um		12.69%
53	um		2.11%
38	um		

6.62

ex. 21 (continued)

MORTAR ANALYSIS: DATA SHEET

Name ____________________ Sample No. 4-Ro-m

Date ____________________ Origin of sample Rockland
Interior 3rd floor from below stair to roof.

Visual description of sample (color, texture, hardness, inclusions, etc.): very light, white, fine grain

Difficulty in disolving may be gypsum plaster

Mortar Analysis :

Original weight of powdered sample (W_1) = 25.05

Weight of filter paper (W_2) = 5.60 + .57 = 6.17

Weight of filter paper + dry fines (W_3) = 7.00 g.

Weight of dry fines (W_3 - W_2) = .83 g.

Weight of dry sand (W_4) = 7.95 g.

% of sand ((W_4/W_1) x 100) = 31.7[illegible]

% of fines ((W_3 - W_2)/W_1 x 100) = 3.31%

% of dissolved binder = 64.9[illegible]%

Observations: dissolution of binder, color of liquid: yellow liquid

---

Characterization of Sand:

7.95

Microscopic Examination

% Finer than

4.75 mm	
2.36 mm	
1.18 mm	
600 um	
300 um	
150 um	
75 um	
53 um	
38 um	

ex. 21 (continued)

MORTAR ANALYSIS: DATA SHEET

Name ______________________ Sample No. 6-Ro-m

Date ______________________ Origin of sample Rockland
Outside rubble dash stucco
Undercoat 1-Ro-m

Visual description of sample (color, texture, hardness, inclusions, etc.): Brown [illegible] w/ large aggregate
Soft.
Iron fragments

Mortar Analysis :

Original weight of powdered sample (W_1) =	25.06
Weight of filter paper (W_2) =	5.72 + .54 = 6.26
Weight of filter paper + dry fines (W_3) =	8.01 g
Weight of dry fines (W_3 - W_2) =	1.75 g
Weight of dry sand (W_4) =	17.22 g
% of sand ((W_4/W_1) x 100) =	68.71 %
% of fines ((W_3 - W_2)/W_1 x 100) =	6.98 %
% of dissolved binder =	24.3 %

Observations: dissolution of binder, color of liquid: ______

17.20 g

Characterization of Sand:

Microscopic Examination

% Finer than			
4.75	mm	[illegible]	
2.36	mm	[illegible]	
1.18	mm	5	
600	um		16.74 %
300	um	1	10.3 %
150	um		6.%
75	um		[illegible]
~~53~~	~~um~~		[illegible]
38	um		